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Coal Age

JULY, 1944

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Coal
FOR
Victory

AWARD

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W.R. v. 492 Jy-D 1944
LOADER LUBRICATION LASTS 6 Times LONGER

SUN MINE LUBRICANTS

Reduce Loader's Grease Consumption and Cleaning Costs 83%

Equipment failure, caused by improper lubrication, means lost production, man hours and money. In many cases unusually severe operating conditions are the cause of difficulties which only a careful study can remedy. Proof of this is found in the mine operating loading equipment in the presence of water.

Shutdowns every 2 or 3 days were necessary to clean out the gum which formed in the transmission case and gathering heads of the loader. Results . . . high grease consumption . . . excessive maintenance . . . and slowdown in production.

Trouble stopped when a Sun Engineer suggested a remedy. He discovered the high sulphur content of the water caused the competitive grease they were using to

separate and form gum . . . and recommended a Sun Mine Grease.

Amazing savings were effected in labor costs alone by reducing the frequency of cleanings. Only one-sixth the amount of grease was consumed and valuable production time was gained.

Whatever your lubrication problem may be there's a Sun Mine Lubricant and Sun Oil Engineer to help you solve it. And, as part of Sun's service to the coal industry, there's a brand-new lubrication handbook just issued entitled "How To Get The Most Out of Your Lubricants." Write for your copy today. It's yours for the asking.



SUN OIL COMPANY • Philadelphia 3, Pa.

Sponsors of the Sunoco News Voice of the Air—Lowell Thomas



SUN INDUSTRIAL PRODUCTS
HELPING INDUSTRY HELP AMERICA

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cooling
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Aviat
COAL A

In war or peace
B.F. Goodrich
FIRST IN RUBBER



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DETROIT

Service station—7 miles up


A typical example of B. F. Goodrich product development

LIGHT oil in winter, heavier in summer is a rule most motorists know and act on—at their corner service stations. A good idea for airplanes, too. But the pilot of a war plane in a matter of minutes—not seasons—may take his ship from summer to winter—from the desert's blistering 140 degrees to the 65-below-zero found at 35,000 feet. And he can't pull into a celestial service station for an oil change on the way up. Some way of cooling the hot oil and warming the cold has to be used, or his engine would be ruined in a few hours.

Aviation engineers knew that a

thermostat could be used to turn on a hot- or cold-air blower at the right times—making the plane its own service station. But conventional thermostats literally fell apart in the extreme heat developed by the engine. And in the extreme cold they just wouldn't work.

Then a thermostat manufacturer developed a control that he was sure would do the job. But his design called for rubber parts that would be unaffected by oil; that could stand being forced against metal repeatedly at high pressures; that wouldn't be affected by high temperatures for long periods yet

would remain flexible at 65 degrees below zero. Such a compound had never before been made. But B. F. Goodrich research men, starting with a synthetic rubber that resisted oil, developed a compound with all the other needed characteristics. Made into precision parts for the new thermostat, it performed perfectly; another B. F. Goodrich development for war that will have useful and important peacetime applications. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.* 

B.F. Goodrich
RUBBER and SYNTHETIC products



"How far that little candle throws his beams"
Wm. Shakespeare

HULBURT

Quality

GREASE



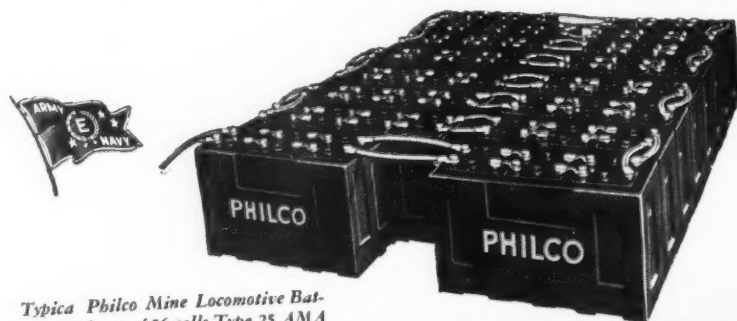
HULBURT OIL & GREASE COMPANY . . . PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

With Modern high capacity PHILCO MINE BATTERIES Tonnage goes up! Costs come down!

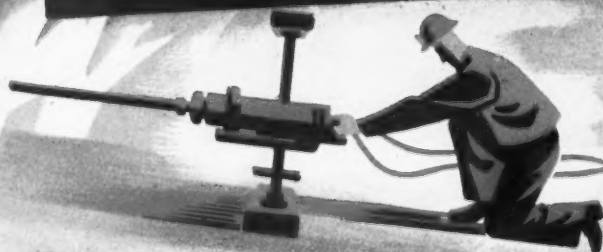
WITH extra capacity Philco Batteries in your mine locomotives and shuttle cars you tremendously increase the daily tonnage capacity of your equipment. The extra reserve of power that's engineered into a Philco provides the added wallop necessary to keep heavier loads rolling at top speed—grade or no grade. And in a Philco you get the toughest battery construction ever developed for mine usage. That means lower maintenance cost and many months longer life. Find out about the superior performance records of Philco Mine Batteries. Do you have our latest mine battery catalog? Write for it today.

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STORAGE BATTERY DIVISION, TRENTON 7, NEW JERSEY
Backed by 50 years of experience in industrial storage battery development.



Typical Philco Mine Locomotive Battery made up of 56 cells Type 25 AMA

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Coal Age

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FROM

To

SIGNED



Designed and built to stand up and deliver the goods under the most severe conditions!

★ The Whaley "Automat", first and foremost, is a high capacity, low maintenance coal loader. In addition, it has proved to be an outstanding machine in the heavier duty of complete seam mining where coal and slate or rock are shot together and loaded in one operation.

The basic reason for the Whaley "Automat's" ability to stand up and deliver the goods under severe conditions is its smooth, automatic shovel action which is an exclusive feature of the Whaley

"Automat". It is this smooth, easy, shoveling action that permits the Whaley "Automat", operated by only one 25 H.P. motor, to maintain an average loading rate of 3 tons per minute in coal, rock or any other loose material.

Write for further information about the "Automat" for coal loading, complete seam mining, cleaning up falls, grading, brushing or other rock work. When writing, give us some information regarding your present operating conditions.

Anticipate your loading machine requirements for 1945 now. And remember . . . you get an all purpose machine when you get an "Automat". Myers-Whaley Company, Knoxville 6, Tenn.

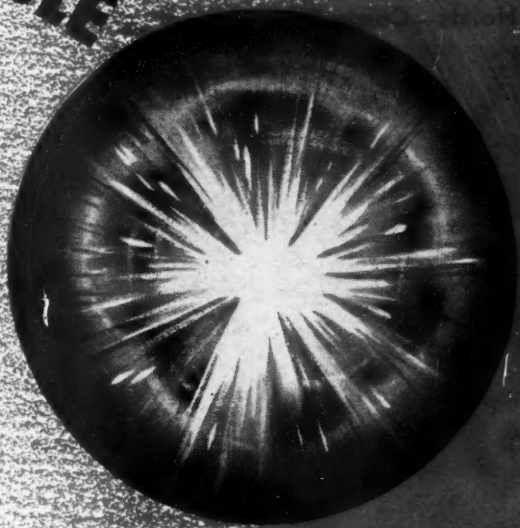
MYERS-WHALEY

Mechanical Loaders

Exclusively

for Over 36 Years

A CLEAN HOLE



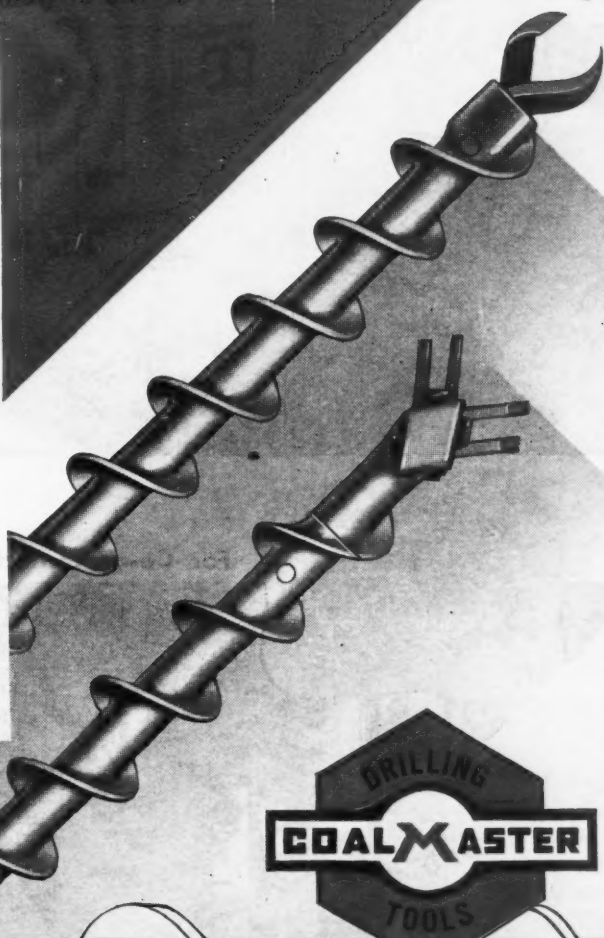
A CLEAN BLAST

A blast will go off clean if the blast hole is clean and straight. This calls for Coalmaster Tools. They are designed to drill straight holes smoother and faster.

They are accurately aligned from threadbar to toolpoint. Their staggered bit positioning starts holes easily and drills without choking. No hard streaks or bands deflect drilling head or auger.

Coalmaster Tools break up the coal without powdering and convey it out of the drill hole automatically.

The first step to speeding up your production is to use our cost-free engineering service.



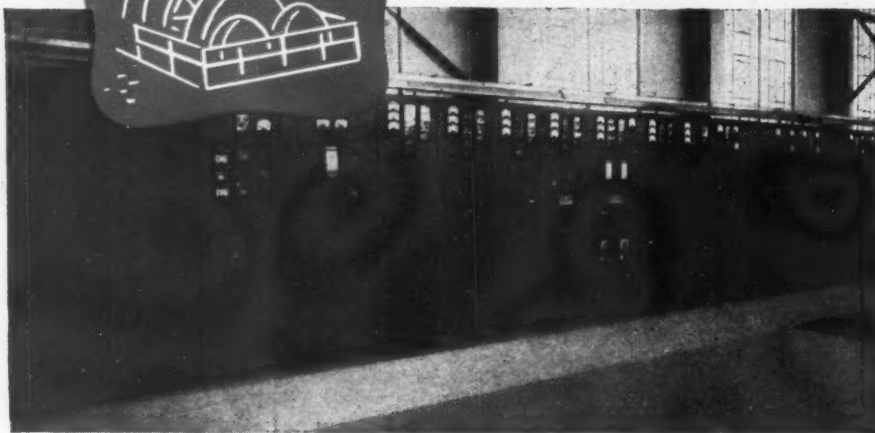
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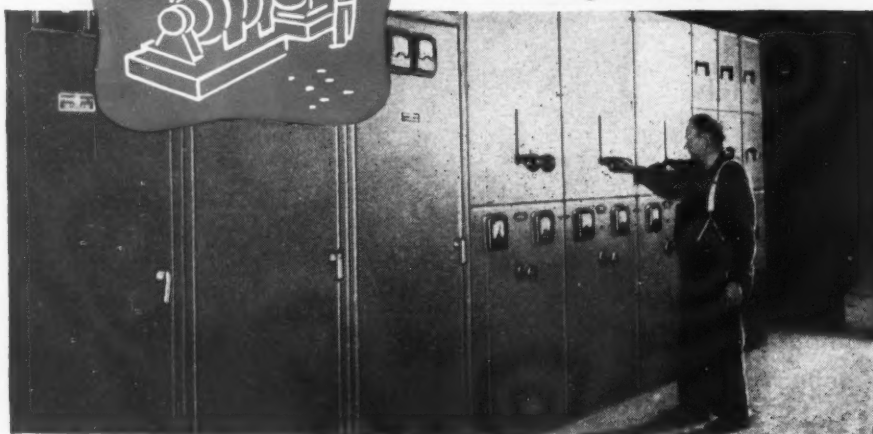
For Hoists—Compressors



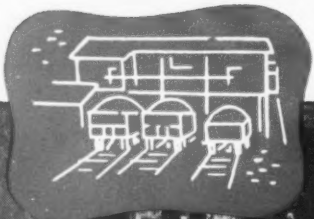
● This modern G-E factory-assembled metal-clad switchgear equipment provides circuit protection and metering for hoists and compressor drives at a newly equipped iron-mining project. Included are units for full-voltage starting of induction motors, for reactor starting of others, and for protection of feeder circuits.



For Motor-generator Sets



● Operating the metal-enclosed control equipment for three 250-kv motor-generator sets supplying excitation for a battery of ore separators. In the foreground are three enclosed motor starters which also serve the ore-preparation operation.



For Co-ordinated Motor Control

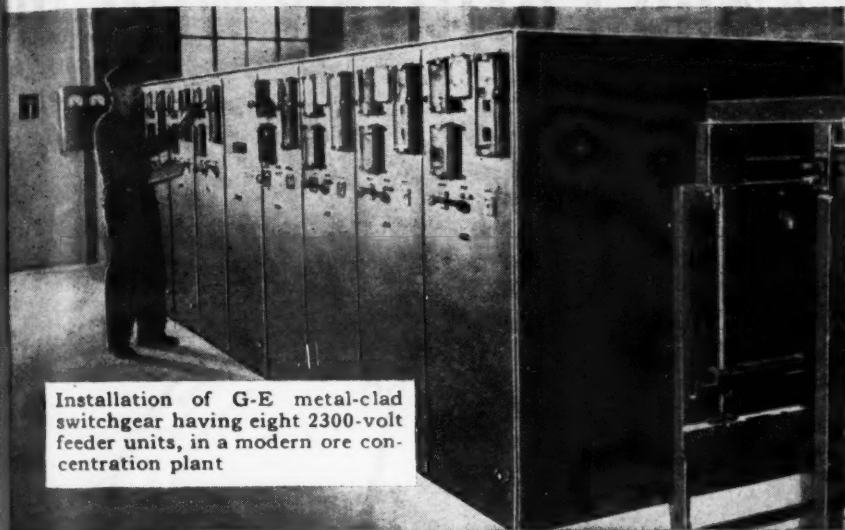


● This G-E Cabinetrol assembly is typical of centralized low-voltage control applied to coal-tipple operation. Standard enclosures are used in combinations matched to the job. All operations are controlled from a desk-type push-button station.

EVERY WEEK 102,000 G-E EMPLOYEES PURCHASE MORE THAN A MILLION DOLLARS WORTH OF WAR BONDS.

For Mining and Preparation

USE G-E METAL-CLAD *Switchgear*



Installation of G-E metal-clad switchgear having eight 2300-volt feeder units, in a modern ore concentration plant

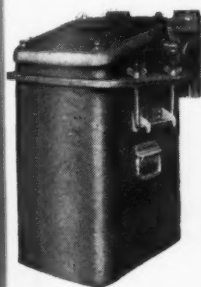
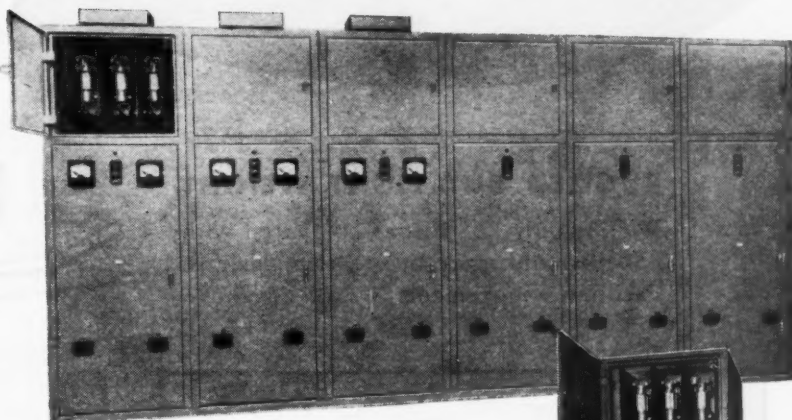
Now, you can protect the continuity of power flow to your operations with switchgear that's completely co-ordinated, completely metal-enclosed. G-E metal-clad switchgear reaches you in fully assembled units. You skid it into place, it's ready to connect. Installed costs are generally lower than for "home-tailored" jobs.

Many special features are built into G-E metal-clad switchgear which save maintenance time and help eliminate hazard to personnel: easily removable breakers which can't be removed when energized; sturdy mechanical interlocks; accessible drawout relays and meters.

Our metal-clad switchgear meets any conceivable switching need up to 15,000 volts, 500,000 kva, and similar equipment is available for higher-capacity installations.

... AND METAL-ENCLOSED *Motor Control*

Whatever your motor-starting problem, a-c or d-c, 1 hp or 1000 hp, G.E. can furnish factory-assembled control equipment in a metal enclosure that, for the service conditions involved, means extra safety. Co-ordinated control equipment, grouped in cubicles or matched to form a unit control board, helps centralize operations of preparation or refining plants. Other standard controls are available in dust-tight enclosures, and in Type BM enclosures for use underground in gassy mines.



This popular type of oil-immersed a-c starter is designed particularly for use in dusty, corrosive, or hazardous-gas locations. It's available as a combination of magnetic starter plus manual circuit breaker, or starter alone.

These metal-enclosed matched units combine starting and protection for 2300-volt a-c motor circuits. Included are types for squirrel-cage and wound-rotor motor starting. Above the enclosed oil-immersed contactor are current-limiting fuses in trunnion-hinge mountings which act as disconnect switches as well.



GENERAL ELECTRIC COMPANY, SCHENECTADY 5, N. Y.

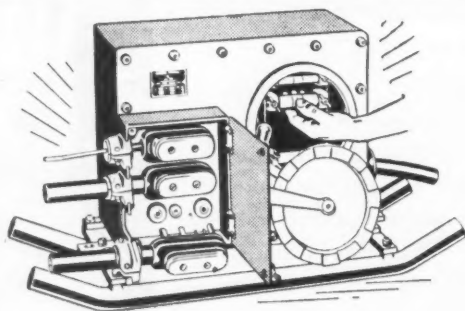
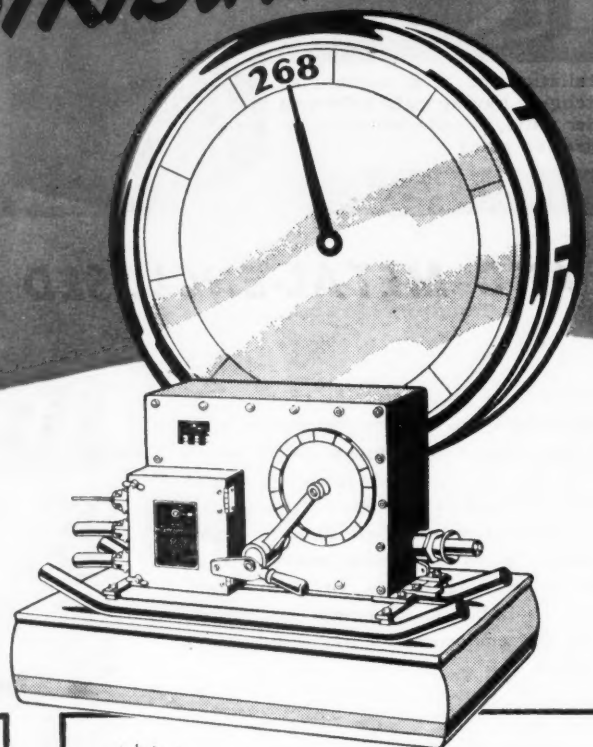
GENERAL ELECTRIC

657-29-201

Make Power Connections in Gaseous Areas Safely and Positively with the **NEW O-B TYPE LG GAS-PROOF MULTIPLE DISTRIBUTION BOX**

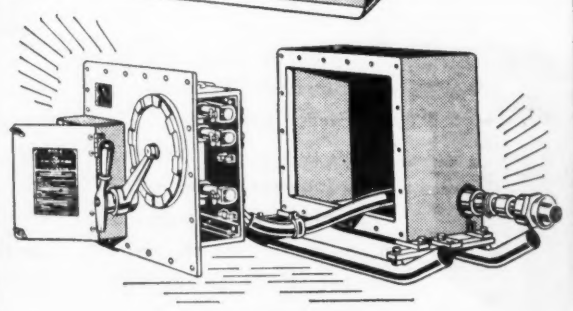
RUGGED BUT LIGHT WEIGHT

Weighs only 268 lbs. as compared with 450 lbs. and more of previous designs. Facilitates movement as face advances



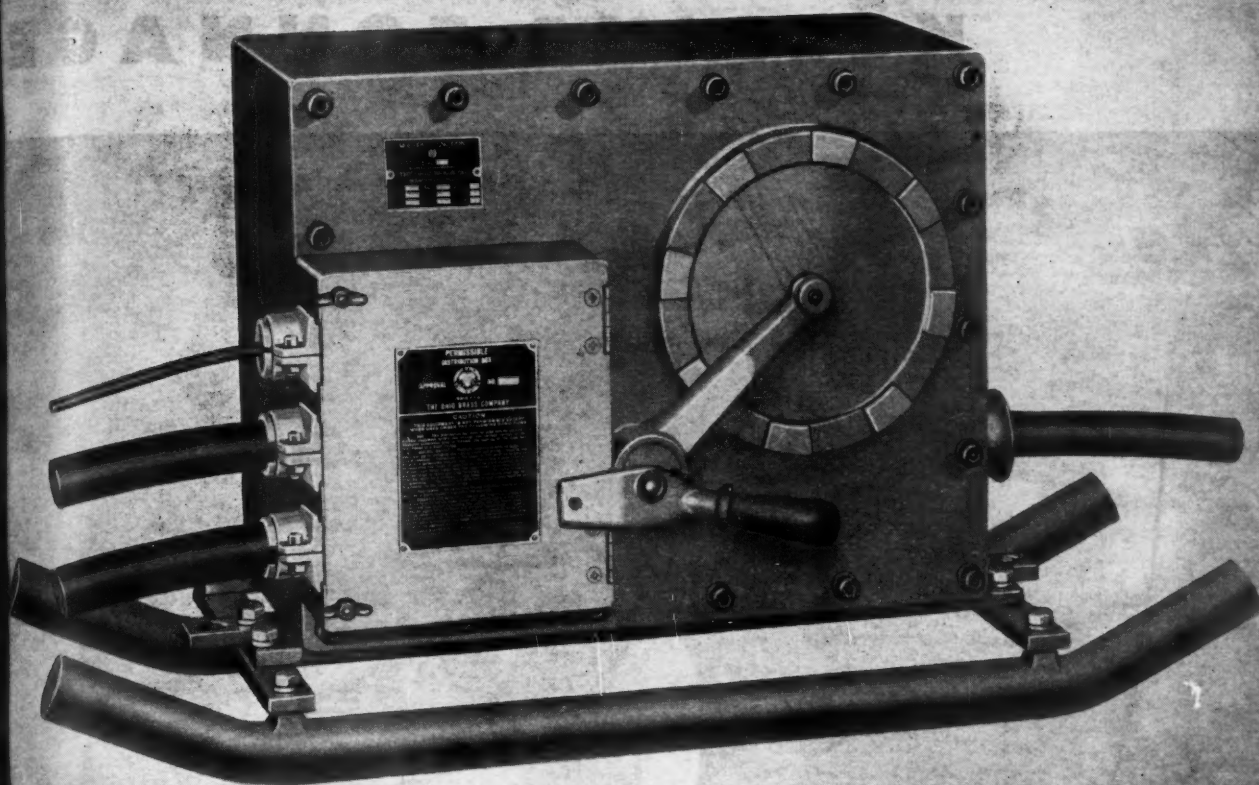
CONVENIENT HAND HOLE TO FUSE COMPARTMENT

Large hand hole makes it easy to change fuses
Both hand hole and plug box interlocked with switch to prevent access with power "on"



ALL PARTS ACCESSIBLE

Entire mechanism mounted on cover—easily removed for inspection



APPROVED BY U. S. BUREAU OF MINES
FOR USE IN GASEOUS AREAS

- Three circuits, two fused at 250 amp. and one at 30 amp. for overload protection.
- Plug terminals arranged to prevent improper polarity hook-ups.
- Cables easily installed in the field. Safety ground protection incorporated in plug circuits.
- Skid-mounted for portability.
- Plug box entrance clamps take up strain on cable.
- Overall dimensions—20¾ by 14½ by 40½ in.
- Available for either 250 or 500 volt service.

2507M

Ohio Brass
MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

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KEEPING TONNAGE



FREE! Texaco Maintenance Lubrication Charts show clearly not only where to use Texaco Marfak, but when and with what lubricant to service each lubrication point in all leading makes of cutters, loaders, locomotives, etc. Order the Charts you need by make and model. Write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO

ON THE...

60

TODAY'S acute manpower shortage throughout the coal industry points more and more to the need for keeping every available piece of mechanized equipment on the job.

One sure way of doing this is through really effective lubrication . . . Texaco lubrication.

Texaco Marfak, for example, in both anti-friction and plain bearings of cutters, loaders, shuttle cars, locomotives, etc. provides ideal film lubrication inside the bearing, yet maintains its original consistency at the outer edges . . . sealing itself in, sealing out dirt and water. Its tough adhesive film cushions against shocks, and makes parts last longer.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, *National Sales Division, Dept. C*, 135 East 42nd Street, New York 17, N. Y.

MARFAK



INCLUDE **LIMA** IN YOUR FUTURE EXCAVATOR PLANS



The ever increasing demands for greater tonnage are causing many open-pit mine operators to crowd their shovel and dragline equipment to the limit. Those who have LIMA-BUILT equipment are fortunate because they have shovels and draglines designed and built to meet such an emergency. Equipped with anti-friction bearings throughout, big wide drums,

independent clutches, heavy duty power plant, fast mobile crawlers and strong dependable front end equipment, LIMA shovels and draglines give their owners the kind of service needed to meet present day stripping operations. At the present time most of our output is going to the armed forces. We are anxiously awaiting the day of Victory when we can give your excavator needs our undivided attention.

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SHOVELS, ¼ YD. TO 3 ½ YD.

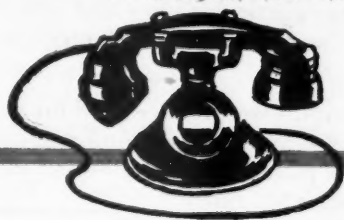
DRAGLINES, VARIABLE

CRANES, 13 TONS TO 65 TONS

U. S. ROYAL

MINING MACHINE
AND LOCOMOTIVE CABLES

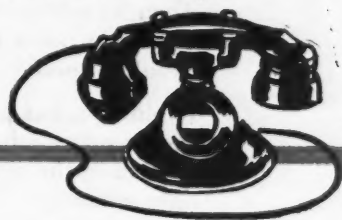
THIS LINE IS
BUSY
FOR THE DURATION



"U. S." WAR-TYPE

MINING MACHINE
AND LOCOMOTIVE CABLES

THIS LINE IS
FOR YOUR USE
NOW



The war emergency prevents our filling orders for U. S. Royal Mining Machine and Locomotive Cables. But we can supply your needs with "U. S." War-Type Mining Machine and Locomotive Cables. They are made to the high standard of excellence, with the skill and experience you naturally associate with the "U. S." seal... for many years a trustworthy mark of dependable, long-lived service. A number of types and sizes are available for immediate shipment.



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UNITED STATES RUBBER COMPANY

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To Make the Most of His Skill He Must Use the Right Tool

Before a carpenter makes a cut with his plane he studies the job—so he'll know *which* plane will produce best results. Is it a deep or thin cut, wide or narrow, with or against the grain? How hard is the wood? Are there knots?

Then he selects the plane that's *built* for that particular job—and *uses* it right. He holds it "just so," applies just the right amount of pressure. Result: A perfect cut.

Explosives, like planes, are also tools. Some explosives produce good breakage on many jobs, but other jobs call for a *special* explosive. And it must be used in the right way. The charge must be planted "just so"—and the right quantity. *Then* you get good blasting, save time, labor, equipment.

Atlas Representatives, with their extensive knowledge of rock formations and explosives, apply synergistic* thinking to the blasting problems of customers—and produce those "2 plus 2 equals 5" results that build blasting profits.

The Atlas man studies all the facts, discusses the pros and cons with the blaster, combines ideas with him. Then the answer evolves: "Use *this* explosive, in *this* amount and in *this* manner—and you will get utmost in fragmentation."

Let us work synergistically with you on YOUR blasting problems. Consult Atlas.

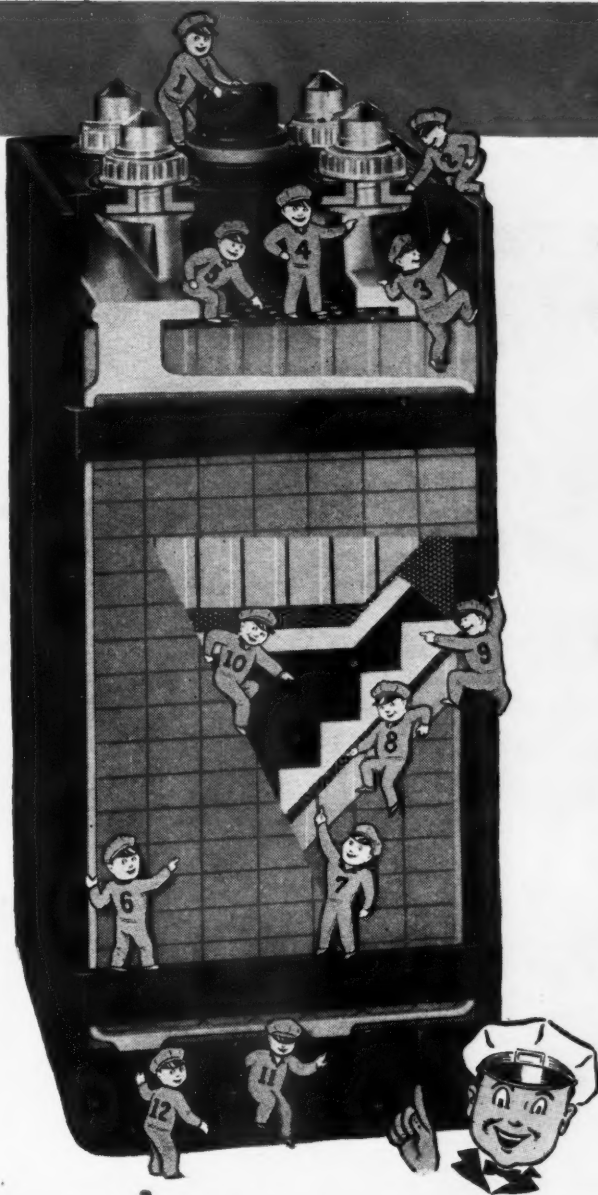
***Synergism:** *The force that produces "2+2=5" results when you and we get together and really "click."*

ATLAS

EXPLOSIVES
"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco



FEATURES THAT MAKE PERFECTION IN GOULD BATTERIES

Gould has been constantly testing and perfecting the design of the Gould Kathanode, while still retaining the revolutionary spun-glass mat protection first introduced by Gould to American industry.

Some improvements have been small, some large. Each has added to the battery's efficiency and has made it a better product. Together they continue to maintain the enviable twenty year record of the Gould Kathanode in meeting actual service conditions in all industries.

Write Dept. 97 for Bulletin 100 on Gould Kathanode Glassklad Batteries for Industrial Trucks and Tractors.



FOR EXCELLENCE IN STORAGE BATTERY PRODUCTION AT DEPEW PLANT

GOULD

Since 1898 THE BATTERY PICKED BY ENGINEERS

**GOULD STORAGE BATTERY
CORPORATION, Depew, N. Y.**

Factories: Atlanta • Chicago • Dallas
Depew • Leavenworth • Los Angeles
North Bergen • Rock Island • St. Paul
Sioux City • Zanesville

— Buy War Bonds —

1 BAYONET TYPE VENT: Quarter-turn lock type readily removable for flushing and checking.

2 TERMINAL POST SEAL: Acid resisting soft rubber spool type bushing which acts as a cushion between post and cover. It is held in compression between a flange on post and an alloy nut to make an acid tight seal.

3 SEALING: Exceptionally deep recess between the jar walls and reinforced hard rubber cover is filled with a sealing compound of unusual elasticity and adhesion, to withstand vibration and insure a permanent seal.

4 CROSSBARS AND TERMINAL POSTS: Sturdy construction assures excellent conductivity and great mechanical strength.

5 SEPARATOR PROTECTOR: Perforated hard rubber baffle protects separators during testing.

6 NEGATIVE PLATE: Antimonial lead grid of interlocking bar design. The negative active material is a highly porous metallic oxide compounded to special Gould formulas. It assures close electrical contact, low internal resistance, and high sustained capacity in balance with the Kathanode positive unit.

7 DURAPOR SEPARATORS: Made of heat and acid resistant porous rubber with deep grooves and shallow web. They are mechanically strong and allow for free circulation of the electrolyte. Uniform chemical and physical properties assure balanced resistance throughout the cell.

8 PERFORATED RUBBER ENVELOPE: Holds the spun-glass mat in place and provides additional insulation.

9 GLASSKLAD RETAINER MAT: Retains the useful, power producing active plate material throughout battery life.

10 POSITIVE PLATE: Antimonial lead grid of heavy cross-section is the holding structure for the positive active material, especially developed for Kathanode by Gould.

11 SEDIMENT CHAMBERS: The Kathanode Glassklad retainer mat minimizes shedding of active material. As a result sediment chambers are reduced to less than half the height necessary in ordinary batteries. This permits the use of larger plates with more active material and a greater volume of electrolyte above the plates where it is most beneficial.

12 HARD RUBBER JARS OR MONO-BLOC CONTAINER: Compounded to meet the rigid Gould specifications, providing great tensile strength and high impact resistance for long, uninterrupted service.

Goodman Shaker Co.



A combined loading and transporting system for both high and low coal. It is of particular advantage in close posting and heading.

... for a continuous flow of coal from face to car loading point.

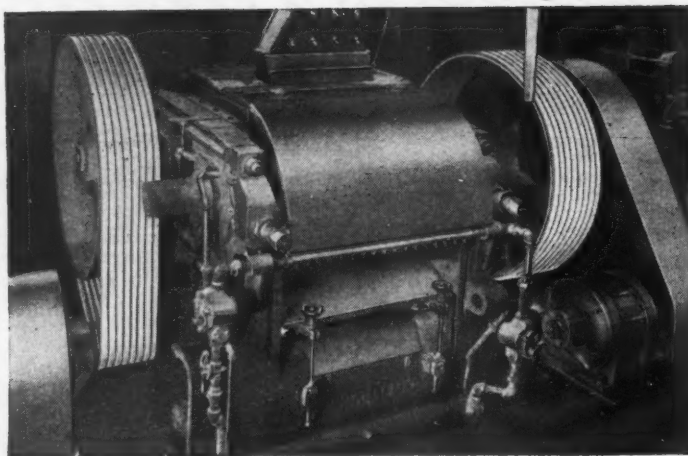


GOODMAN MANUFACTURING COMPANY

er Conveyors and Duckbills



Y
HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS



*

One TYPICAL EXAMPLE

On these flaking rolls where gas flames create considerable heat, Gates V-belts of special synthetic rubber are used because of their proved ability to withstand bad heat and oil conditions. By actual records, on hundreds of installations where oil or heat conditions are severe, Gates special synthetic V-Belts are wearing 2 times to 3 times as long as any natural rubber belts ever used.

Through More Than 6 YEARS
in Hundreds of Plants *

GATES *Synthetic Rubber* V-Belts

—Have Been **OUTWEARING** Any NATURAL Rubber Belts Ever Used!

Now that all industry depends on belts made of synthetic rubber, it is well worth-while to know that Gates Synthetic Rubber V-Belts have been in nation-wide use for more than 6 years—and through all that time they have been giving service actually superior to belts of natural rubber!

*There are, of course, many kinds of synthetic rubber. Gates uses each kind where it best meets some particular service need.

For example:—one special synthetic rubber which Gates uses extensively in making V-Belts has the ability to withstand oil and heat much better than natural rubber can. Where oil and heat conditions are especially severe, Gates special

synthetic V-Belts are giving 3 times to 4 times the service life of any natural rubber V-Belts ever used.

This is the record not of a few belts over a limited period but of thousands upon thousands of Gates synthetic rubber V-Belts installed in hundreds of plants and factories during the past 6 years.

Gates long headstart in fabricating V-Belts of synthetic rubber is of greater importance to you now than ever before because *all* the V-Belts furnished industrial plants today are of *synthetic rubber*.

You will gain a distinct advantage in V-Belt service by simply picking up your telephone directory and calling the Gates Field Engineer. He will bring right into your plant the full benefits of Gates knowledge and experience without the slightest obligation.

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

CHICAGO, ILL.
549 West Washington

NEW YORK CITY
215-219 Fourth Avenue

ATLANTA, GA.
738 C & S National Bank Building

LOS ANGELES, CAL.
2240 East Washington Boulevard

DENVER, COLO.
999 South Broadway

DETROIT, MICH.
8663 Grand River Avenue

PORTLAND, ORE.
333 N. W. 5th Avenue

DALLAS, TEXAS
2213 Griffin Street

SAN FRANCISCO, CAL.
1090 Bryant Street



TO THIS ↗
TO THIS ↘

Illustrating the advance of
JEFFREY
LOCOMOTIVES
in mine transportation



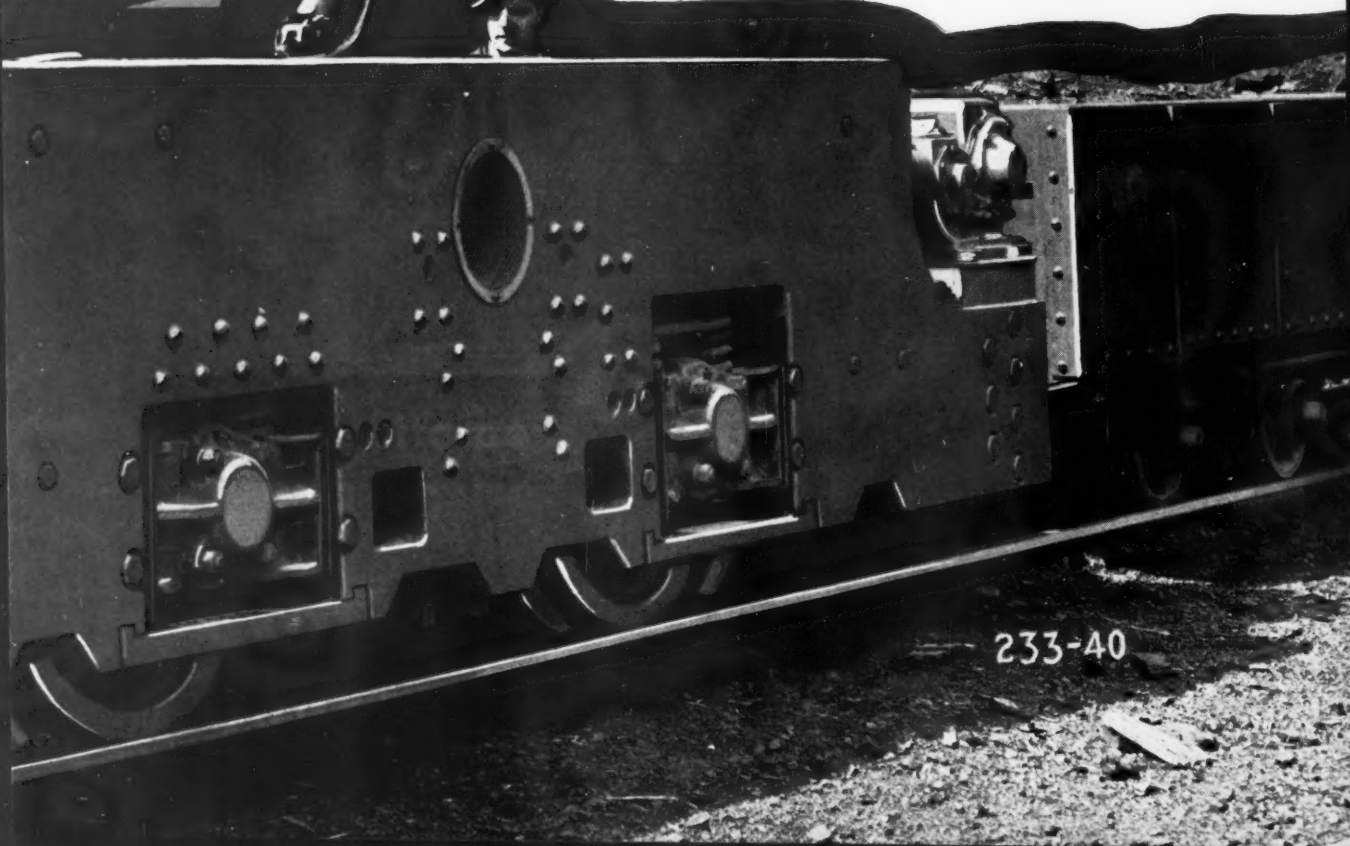
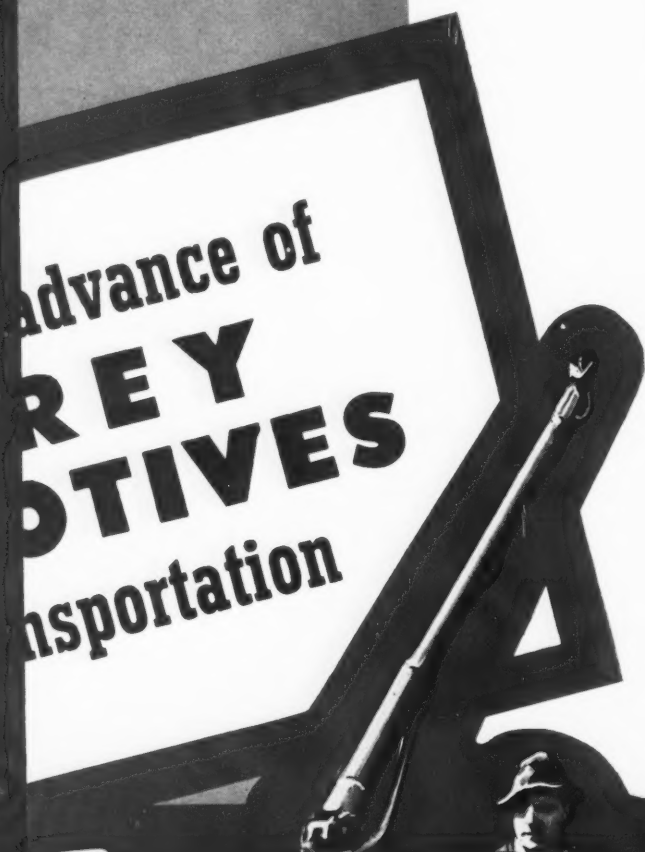
JEFFREY PROGRESS

• From mules to electric locomotives — the first step toward mechanical haulage — to increase production with improved transportation facilities.

Jeffrey, a pioneer builder of electric locomotives, has come a long way in developing units of greater haulage capacity — flexibility and speed.

At the left is shown a Jeffrey locomotive in use over 55 years ago. Contrast this with the modern Jeffrey main haulage 20-ton locomotive shown at the bottom.

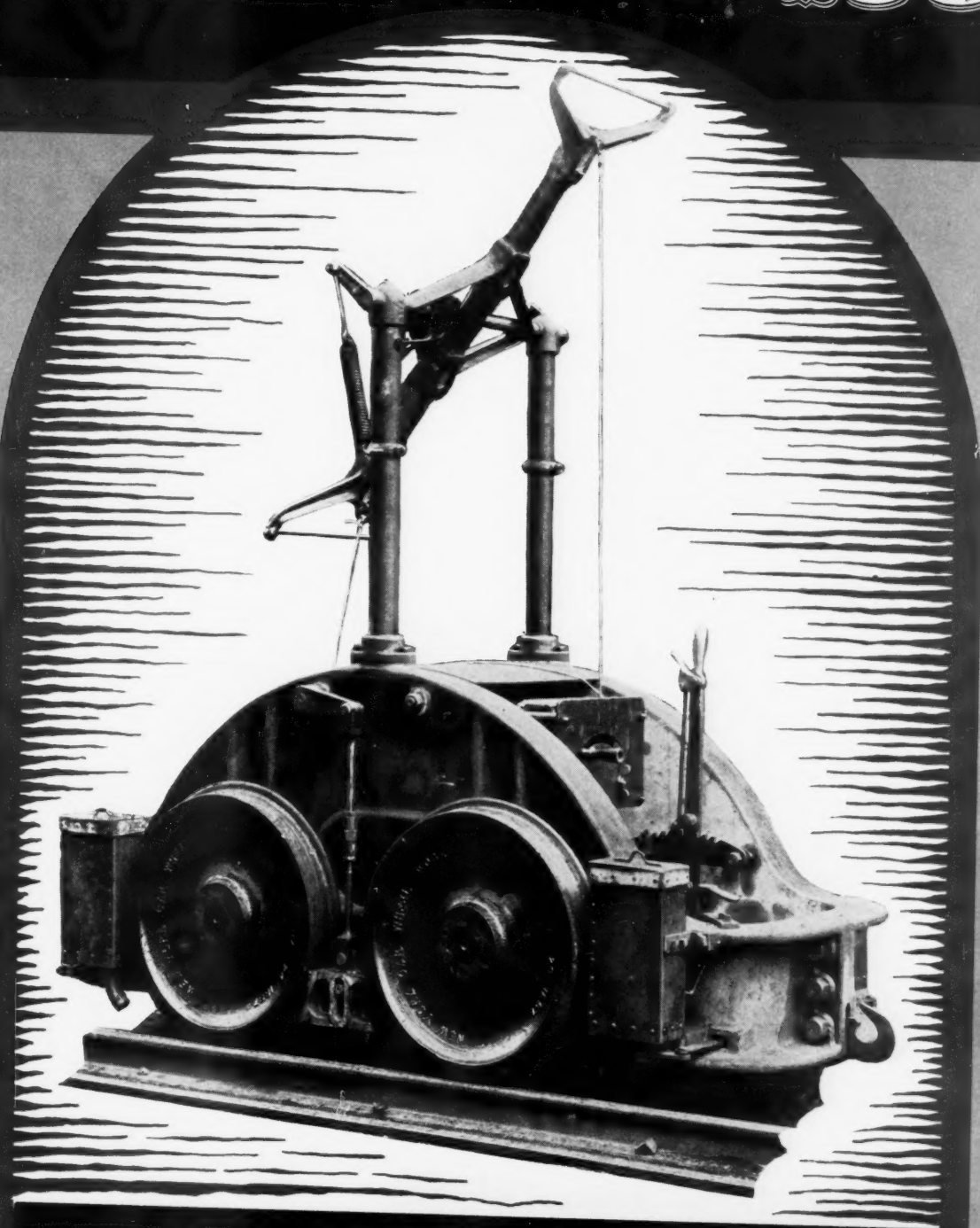
Jeffrey locomotives are built to meet every operating condition. Consult a Jeffrey engineer on your haulage problems. Full descriptive catalog available.





JEFFREY

Mechanical Mine Equipment Since 1880



An Early Jeffrey Locomotive

JM

BUY WAR BONDS

JEFFREY
1880

Jeffrey

**SERVES THE INDUSTRY
BELOW AND ABOVE GROUND
FROM FACE TO RAILROAD CAR**

**CUTTERS
DRILLS
LOADERS
LOCOMOTIVES
FANS
CONVEYORS
BLOWERS
JIGS
CRUSHERS
SCREENS
RENEWAL PARTS**



THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices:

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Birmingham
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Denver
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Service Stations:

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Foreign Plants:

Jeffrey Mfg. Co., Ltd.
Montreal, Quebec

British Jeffrey-Diamond, Ltd.
Wakefield, England

Jeffrey-Galion (Pty), Ltd.
Johannesburg, S. A.

BONDS

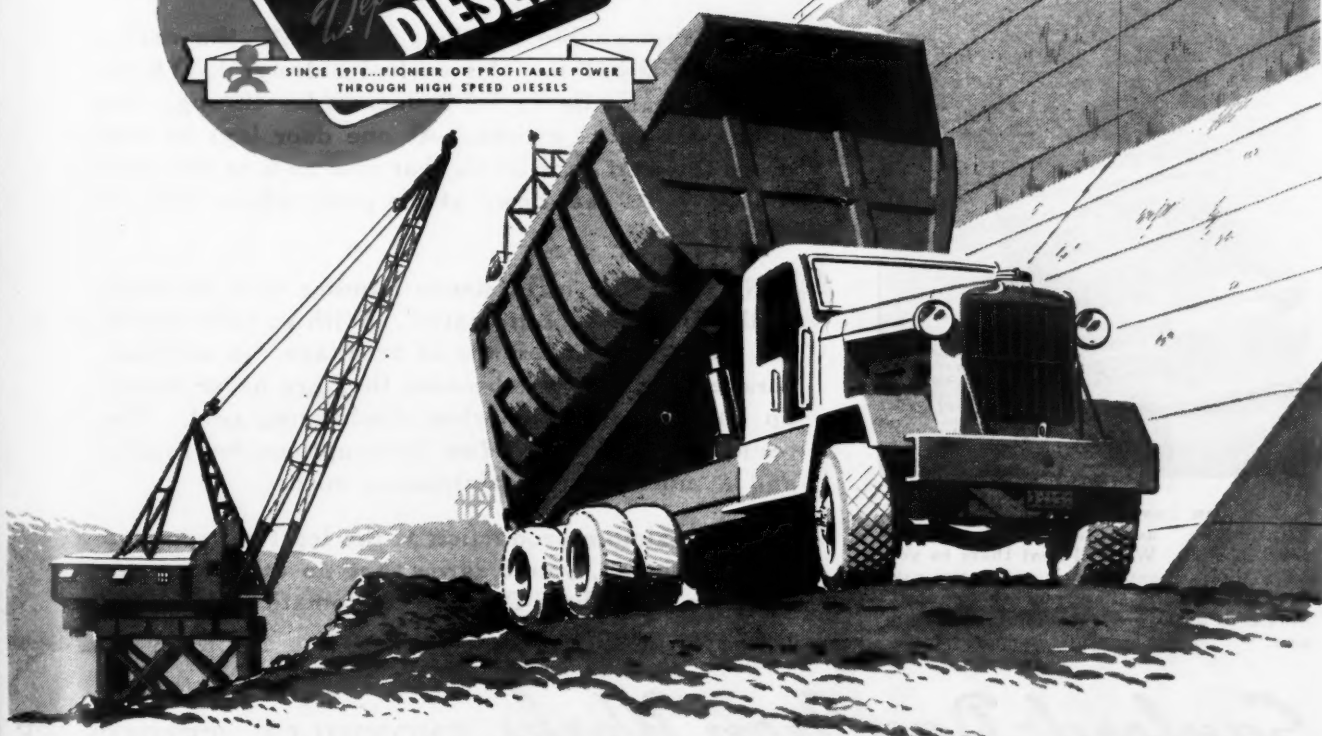
TEN-STRIKE IN POWER



A *ten-strike* is defined as "any successful and decisive stroke or act." That's why we call the modern, high speed Cummins Dependable Diesel a "ten-strike in power." For in every heavy-duty service—automotive, industrial and marine—Cummins' development of the high speed diesel (beginning in 1918) has proved to be a successful and decisive factor in reducing power costs to a new low . . . raising profits to a new high! CUMMINS ENGINE COMPANY, INC., Columbus, Ind.

CUMMINS
Dependable
DIESELS

SINCE 1918...PIONEER OF PROFITABLE POWER
THROUGH HIGH SPEED DIESELS



HEAVY-DUTY MODELS FOR STRIPPING, HAULING, AND GENERATING SERVICE

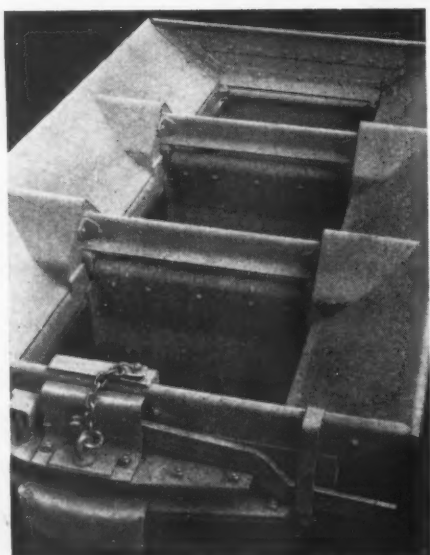


★ The above photograph shows a miniature model S-D 1-2-3 Automatic mine car "laying" coal into a plate glass hopper. All details are to scale of an actual operation. This illustration demonstrates how the S-D 1-2-3 Automatic method of discharging coal is so gentle and how it eliminates unnecessary breakage of coal.

This remarkable car does not DUMP the coal—it doesn't DROP it. This exclusive design LAYS the coal down gently in 1-2-3 door order through one door opening at a time. As one door lays its coal down the next door levels that coal and, at the same time, lays its coal down at the point where slope of coal begins.

No other car in existence handles coal as easily as the S-D 1-2-3 "Automatic". With so little shock, the result is the minimum of breakage. In addition, cars lead an easy life because they are never turned up on end or racked when discharging coal. The result is a longer life, few interruptions for repairs and a much lower maintenance cost.

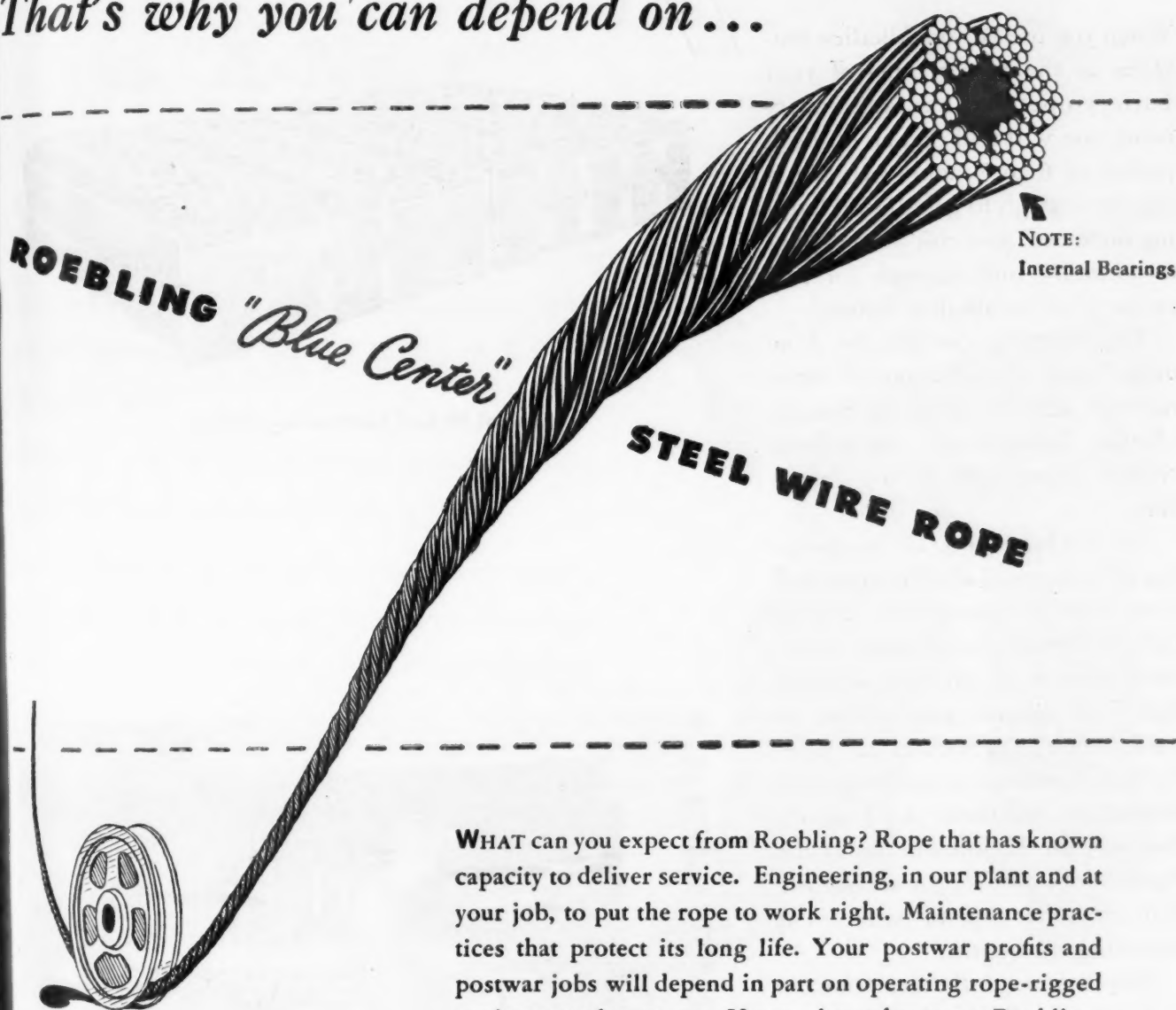
For maximum production at the least cost per ton of coal hauled, you'll agree that no other car can compare with the S-D 1-2-3 "Automatic", once you see them in operation.



You can have all of the S-D 1-2-3 "Automatic" advantages without buying the cars. We will rent them to you on a liberal rental basis and your savings will more than pay the rentals. Write to us now for complete information.

Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

From steel making to rope laying...we never forget this fact...that pound for pound, wire rope has more bearing surface than any other piece of equipment. That's why you can depend on...



WHAT can you expect from Roebling? Rope that has known capacity to deliver service. Engineering, in our plant and at your job, to put the rope to work right. Maintenance practices that protect its long life. Your postwar profits and postwar jobs will depend in part on operating rope-rigged equipment at lowest cost. You can leave that part to Roebling.

JOHN A. ROEBLING'S SONS COMPANY

TRENTON 2, NEW JERSEY

Branches and Warehouses in Principal Cities



Wire Rope and Strand • Fittings • Cold Rolled Strip • Aircord, Swaged Terminals and Assemblies • Round and Shaped Wire Wire Cloth and Netting • High and Low Carbon Acid, and Basic Open Hearth Steels Suspension Bridges and Cables • Electrical Wires and Cables • Aerial Wire Rope Systems

ROEBLING
PACEMAKER IN WIRE PRODUCTS

Charge Them From Off-Peak Power

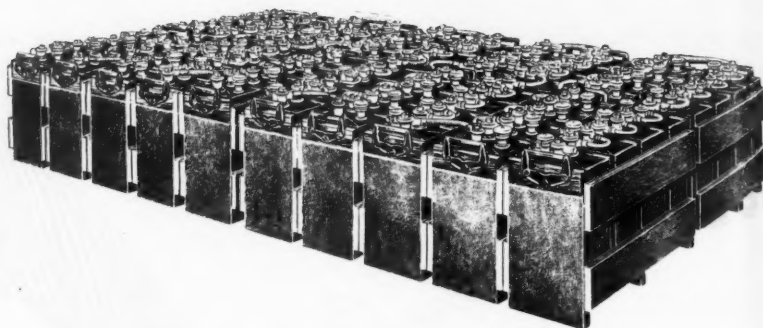
When you use Edison Alkaline Batteries as the power units of your battery-operated haulage equipment, you will find that an off-peak period of 6 to 7 hours per day is usually enough to get all the charging done with low-cost power. That is normally time enough for full recharge of an alkaline battery.

The charging can also be done direct from the d-c power lines through suitable resistors, because alkaline batteries do not require critical adjustment of the charge rates.

Yet this is only one of the operating advantages of alkaline batteries. Their steel cell construction successfully withstands rough usage. Their electrolyte is an alkaline solution that is a natural preservative of steel. Their electrochemical principle of operation is free from self-destructive reactions. As a result, they stay on the job and out of the repair shop; give longer service life than any other type of battery; cut annual operating cost.

*Edison Storage Battery Division
of Thomas A. Edison, Incorporated,
West Orange, New Jersey.*

Edison
ALKALINE BATTERIES



Typical 80-Cell Locomotive Battery



The alkaline battery in this trammer is regularly charged through a resistor from the d-c power supply on the level where it operates.

ROMEY'S^{*} CLASSIFICATION

is "A-No. 1"

Romey's mature age takes him out of the 1-A classification for selective service ... but his many years' experience in making wire and cable gives him a special rating of A-No. 1 in our plant.

Wire is one of the products most urgently needed by the armed forces.

So ... Romey is using his skill, knowledge, background and energy in rolling, drawing, annealing and insulating on the vital home front.

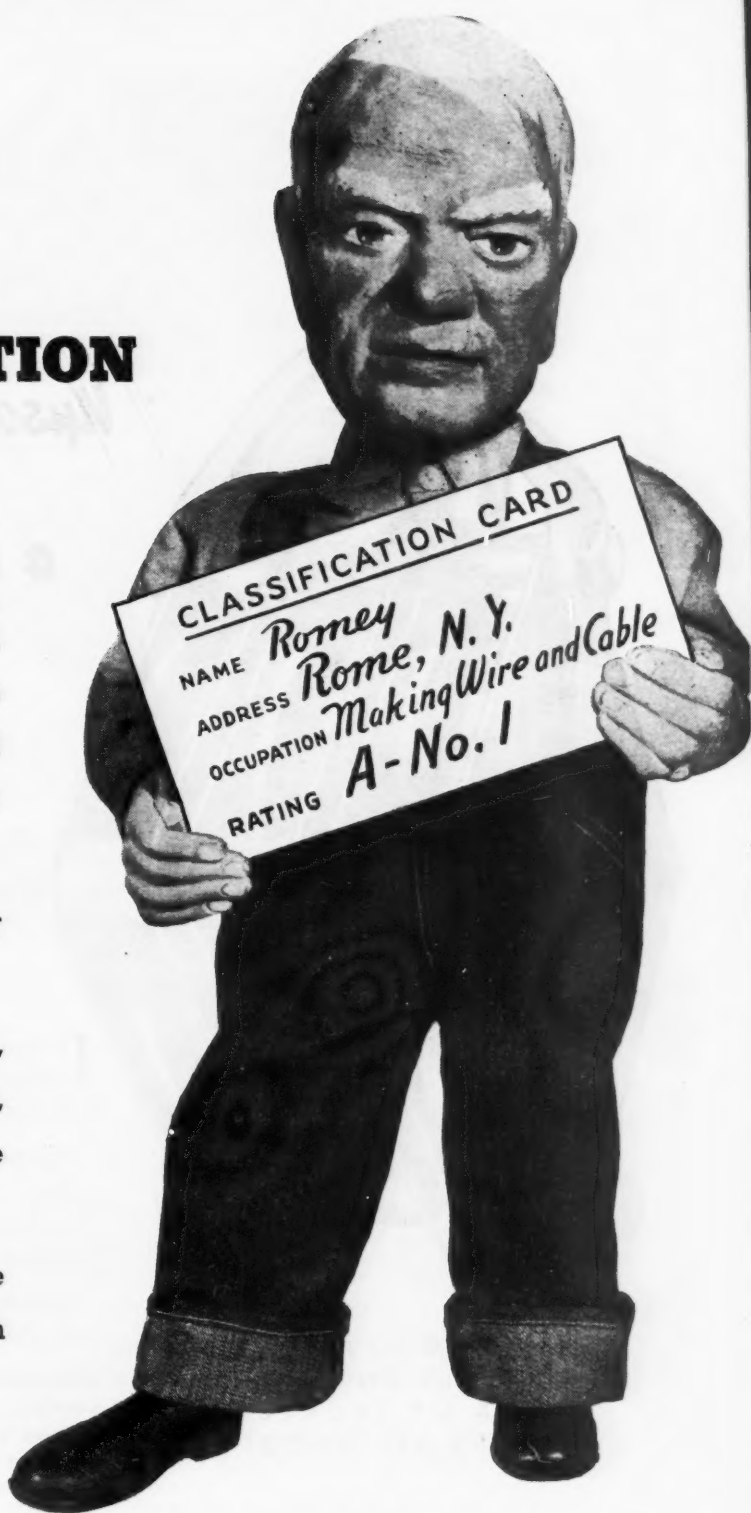
He's a good chap to know and he will be glad to discuss electrical conductors with you any day.

SALES OFFICES

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CHICAGO 6, ILL.
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LOS ANGELES, CALIF.
DETROIT 2, MICH.

See Your Telephone Directory



*Copr. 1944 RCC

FROM BAR TO FINISHED WIRE

ROME CABLE
CORPORATION
ROME • NEW YORK





What makes this Upson-Walton Tackle Block a Better Tackle Block?

AS WE GO TO PRESS,
DELIVERIES ON MOST
SIZES OF TACKLE
BLOCKS ARE GOOD



Established 1871

IF you insist on getting the best value for your money, you must shop carefully. Whether you're buying a pair of shoes, a locomotive—or a tackle block.

Upson-Walton Tackle Blocks of all sizes are engineered to achieve a well-balanced ratio design between weight and strength—to produce a tackle block that gives the *maximum satisfaction in actual use*. A *better* tackle block—and a *better* buy!

Check this partial list of Upson-Walton specifications before you place your next order for tackle blocks.

COLD ROLLED STEEL center pins provide a smoother surface for the bearing which makes it last longer—gives less friction and more efficient hoisting power.

CLOSE TOLERANCE between sheave bearing and center pin on all Upson-Walton tackle blocks results in longer life for the bearings and a truer-running sheave.

HEAVY SHEET PLATES provide greater protection for sheaves. The

block withstands abuse better and rope cannot jam between sheave and shell.

EXTRA HEAVY DROP FORGED connections on all wire rope blocks achieve greater safety, strength and dependability.

HEAVY STRAPS provide greater reserve strength for heavy loads.

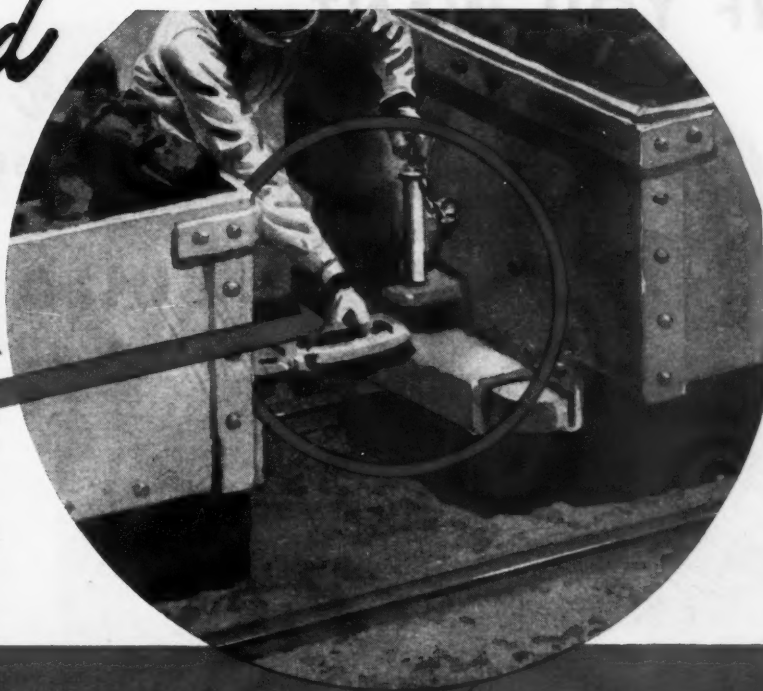
ALL SHEAVES are designed with heavy rim and tread sections—rope grooves are long lasting.

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO

*There's No Need
to Enter the*
**DANGER
ZONE**



When O-B Automatic Couplers are on the Job



Cars Couple Automatically Upon Impact...



...Uncoupled by Raising Convenient Lever
Located on Outside Corner of Car

FEWER LOST-TIME ACCIDENTS MEAN MORE PRODUCTION PER MAN-DAY

With today's increased production quotas and prevalent man-power crisis, it's doubly important to keep your workmen on the job, hauling coal, by protecting them from the hazards of out-moded coupling methods. The loss of even one finger may be translated into lost tonnage. According to reliable figures, 20 per cent of all lost-time accidents may be attributed to coupling. You can help reduce this lost-time accident rate by installing O-B Automatic Couplers. Write today for complete details. Take safety into consideration on your next mine car purchase!



2509AM

IF YOU WANT

Greater strength in your mine cars
(WITH NO INCREASE IN WEIGHT)

... BUILD WITH **COR-TEN**



● It would be hard to find a piece of equipment in any industry that takes more rough treatment than a coal mine car.

Mechanical loaders hurl rock into it—toss in huge lumps of coal weighing a hundred pounds or more—loading booms pound against the car ends—cutter bars are sometimes used at the face as motivating devices—and when derailed, unique and punishing methods are frequently used to get the car back on the track. Added to this is the all too common habit of allowing wet coal to accumulate in the car bottom over too long a period, causing premature corrosion and thus shortening the life of the car. Altogether a coal mine car takes a terrific beating.

Some mine owners take a fatalistic attitude toward these conditions. They figure that cars are bound to be mistreated, so they use the "cheapest" cars available—and then spend exorbitant sums on repair of splintered and rotted bodies.

Others, and they are in the majority, accept abuse as a necessary evil—but offset it by seeing that their cars are built to withstand such damage.

By building with U.S.S. COR-TEN High Strength Steel, they put guts into their cars. Get greater strength and toughness, insure greater resistance to corrosion, abrasion and impact. Obtain at the same time more capacity and less dead weight with a minimum cost for maintenance.

Because of the higher mechanical properties of COR-TEN, these cars assure maximum economy of operation, cost less to maintain and last so much longer that the slight extra cost for superior COR-TEN construction is quickly liquidated.

COR-TEN has again been made available for mine car construction. Our engineers will gladly go into the economics of its application.



AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*

COLUMBIA STEEL COMPANY, *San Francisco*

NATIONAL TUBE COMPANY, *Pittsburgh*

TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

United States Steel Export Company, *New York*

United States Steel Supply Company, *Chicago, Warehouse Distributors*

UNITED STATES STEEL



Rock or Dirt

DUMPED INSTANTANEOUSLY

Time saved on the fill is time saved for every trip . . . more trips per hour . . . more production per shift. The Koehring Dumptor dumps any type material *instantaneously*. Seconds saved over mechanical dumping method speeds up every hauling and dumping job. Rock or dirt is dumped equally fast and the load is dumped clean every time . . . ready for a full load every trip.

KOEHRING COMPANY

Milwaukee 10, Wisconsin

DEPEND ON YOUR KOEHRING DISTRIBUTOR to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

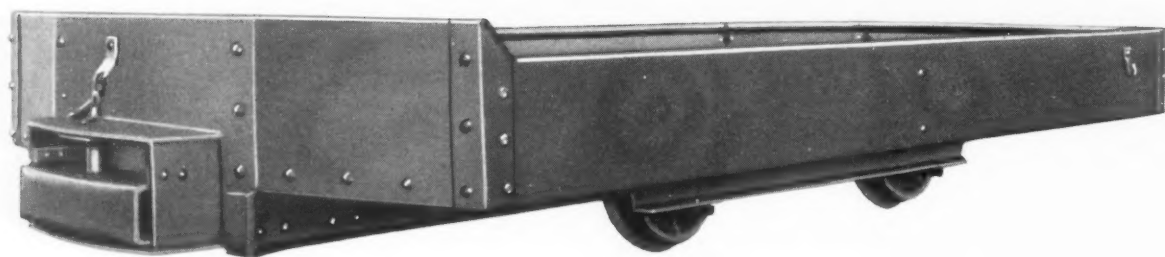
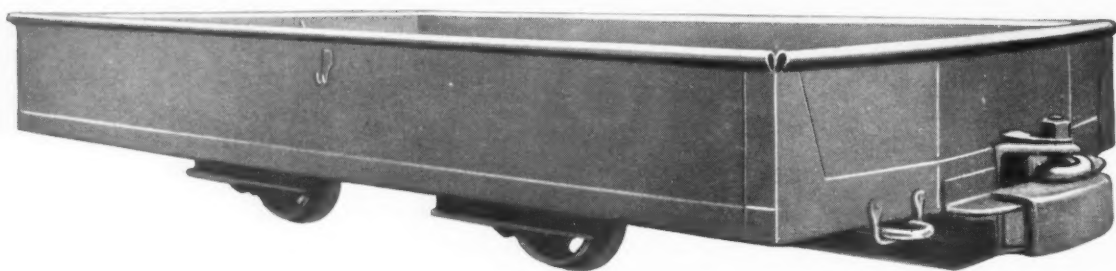
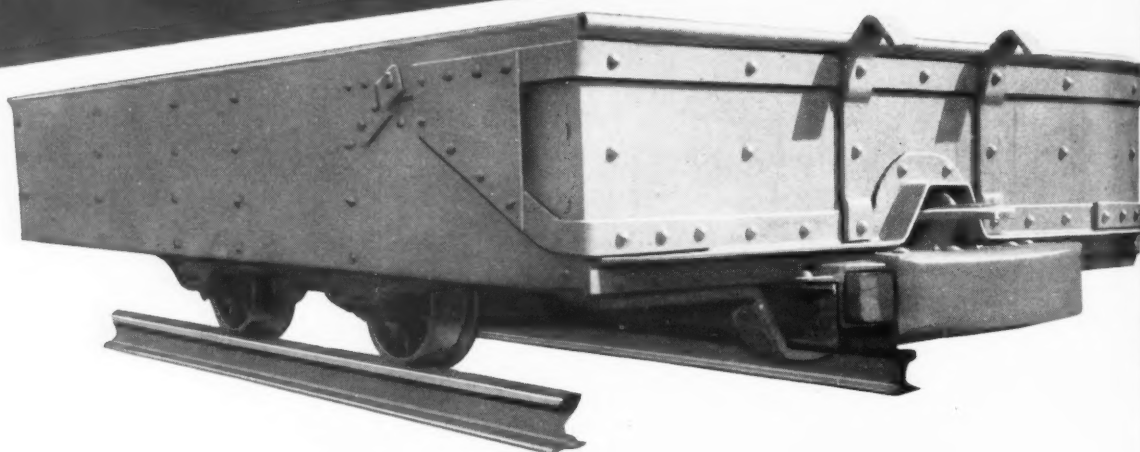
ARMY

NAVY



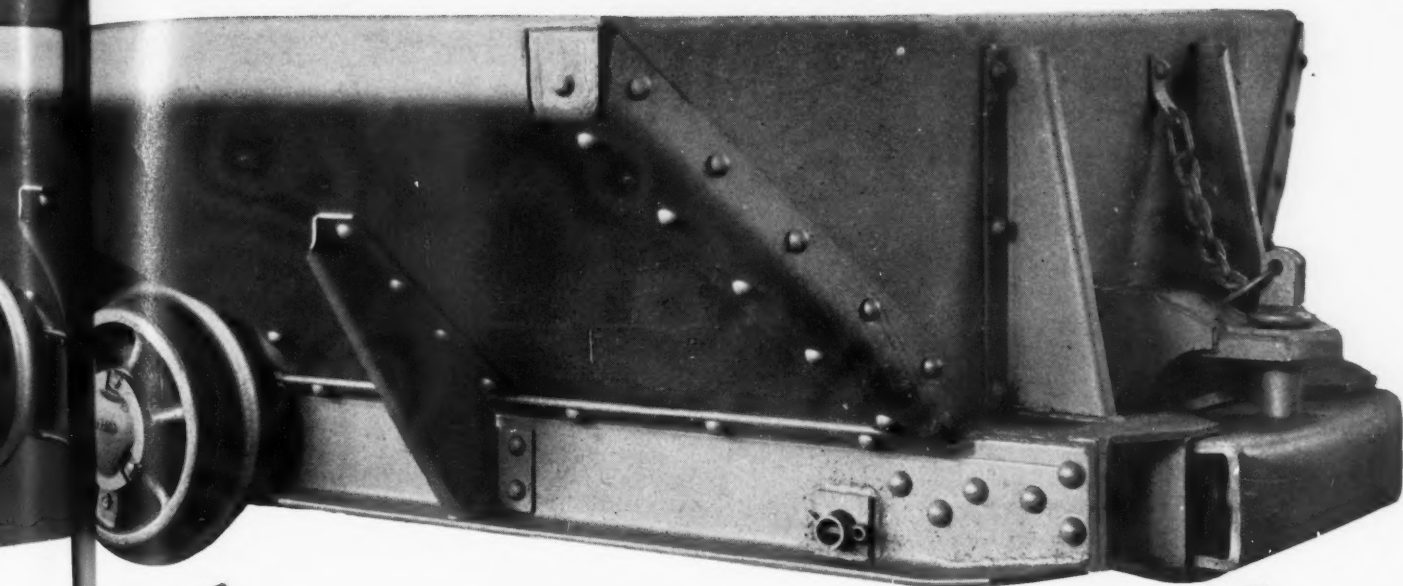
HEAVY-DUTY CONSTRUCTION EQUIPMENT

**WE
HAVE
THE CAR...**



A.C.F. Chilled Tread Mine Car Wheels, as manufactured under our heat-treating process, are made from a special mixture of metals—better for mine car wheels than steel or iron, alone.

a.c.f.



for your job!

YOU SELECT the type of car you want, and we will make it fit your own particular operating conditions. Where coal production costs are too high, the right type of car can make a great difference.

If you are considering drop-bottom cars, **the A.C.F. car shown in the top illustration will give you everything you are looking for in a modern, efficient mine car.**

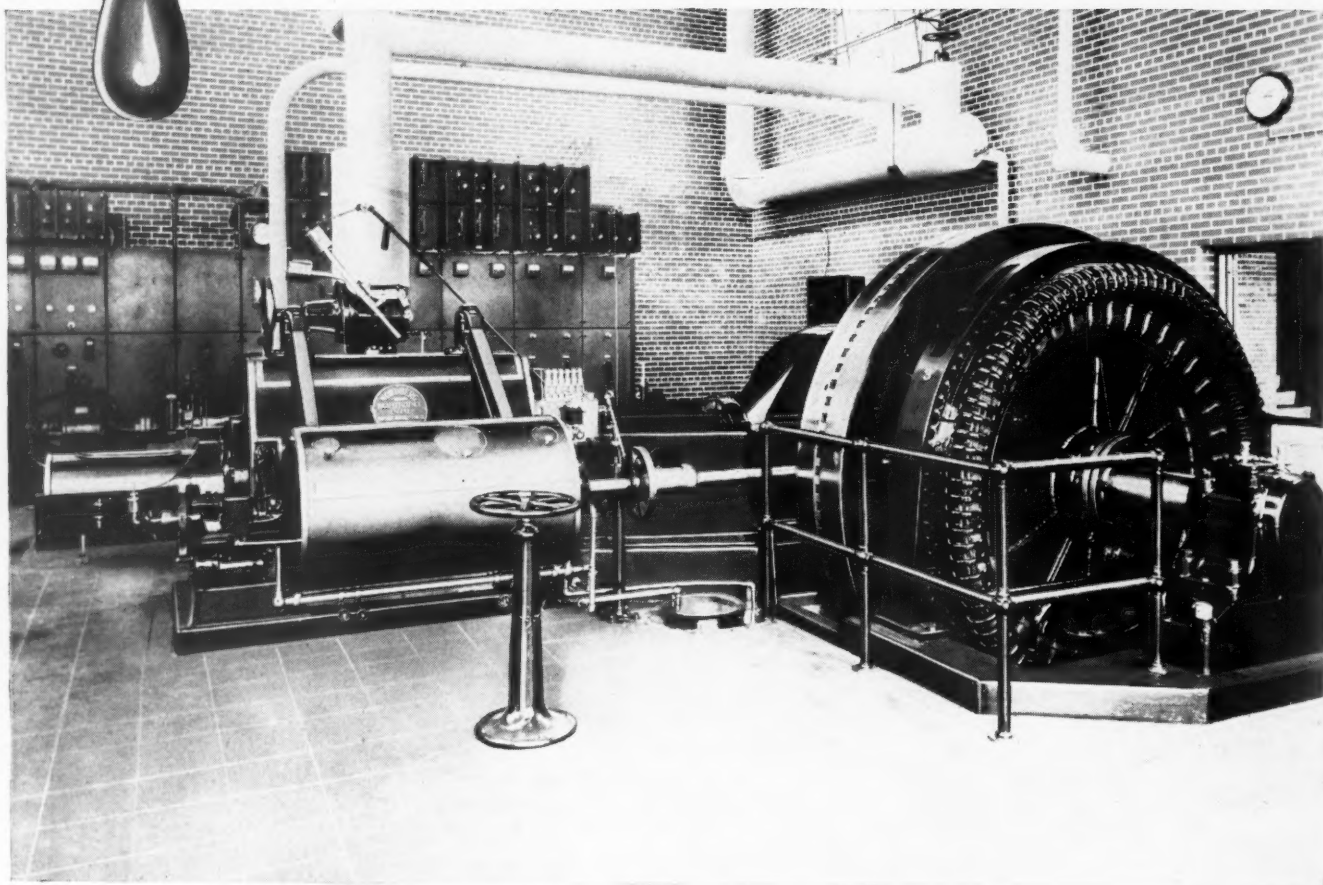
If your old cars must have new wheels and axles, **modern A.C.F. trucks with anti-friction bearings will meet the speed-up of the war demands—and will give you efficient equipment for years of later use at a great over-all saving.**

The delivery of complete cars depends, of course, upon receipt of materials, and on other conditions beyond our control. However, we will do our best to serve you. We can supply needed new wheels, trucks, axles, bumpers, and electrically welded end sill construction with spring bumpers to recondition your old cars.

AMERICAN CAR AND FOUNDRY COMPANY

NEW YORK · ST. LOUIS · PHILADELPHIA · BERWICK, PA. · CLEVELAND · CHICAGO · PITTSBURGH · HUNTINGTON, W. VA.

CORRECT Lubrication **means** *Better Maintenance*



PROBLEM—excessive wear, difficult maintenance.

SOLUTION — *Correct* lubrication.

Sinclair STEAM CYLINDER and VALVE OILS provide *correct* lubrication for steam plants. These oils meet all requirements from extremely wet to highly superheated

steam conditions . . . suit all engine designs, operating characteristics.

If maintenance is your worry you have a lubrication problem. Let us tell you how Sinclair lubricants make for *better maintenance*.

(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)

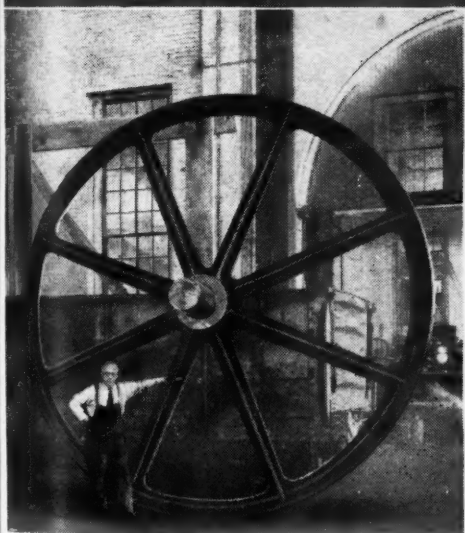
SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

"TIME MARCHES ON"

Old "Bicycle-Type" Sheave with Cast-Iron Hub and Rim.

Vulcan "Allcasteel" Sheave, cast in one piece from 30 carbon steel and accurately machined AFTER heat-treatment. Rope-groove so highly resistant to rope wear that no noticeable change from original correct size and shape has ever been reported—even after as much as 20 years of severe service.



One of the six 14-ft. diameter Vulcan Allcasteel Sheaves recently furnished to a large metal-mining company.

MINING men are usually ultra-conservative—probably because precious lives so often depend upon the accuracy of their decisions. But "time marches on" and improved equipment gradually wins acceptance on its demonstrated merit.

Acceptance of Vulcan Allcasteel Sheaves came slowly at first but has gained momentum so consistently that our list of "Repeat" users now includes a large percentage of the leading companies in both the coal and metal mining fields. Light, strong and highly resistant to rope wear, they have thoroughly proved their money-saving superiority for every type of heavy-duty service. Available in any size—for either vertical or horizontal mounting—with either plain or anti-friction bearings.

VULCAN IRON WORKS

Established 1849

Main Office and Works WILKES-BARRE, PA., New York Office 50 Church St.

Heavy-Duty Electric Hoists
Self-Contained Hoists
Scraper Hoists
Car-Spotting Hoists
Room Hoists

Shaking-Chute Conveyors
Chain Conveyors
Cast-Steel Sheaves and Gears
Cages, Skips and Gunboats
Coal-Preparation Equipment

Steam Locomotives
Diesel Locomotives
geared and electric drive
Gasoline Locomotives
geared and electric drive

Load-Carrying Larries
Rotary Kilns, Coolers and Dryers
Crushing Rolls and Pulverizers
Briquetting Machines
Ball, Rod and Tube Mills

IT TAKES JUST SIX STURDY PARTS
TO MAKE A STRONG

**Walco
WRENCH**



Each of the six parts that make up a Walco wrench is designed to provide maximum strength, safety, and ease of operation. **All parts are made entirely of steel.** Handle and both jaws are drop forged steel, heat treated by precision methods to assure strength, toughness and uniformity.

Each part is replaceable including the exclusive Walco renewable lower jaw. This makes the Walco easy to maintain and good for an indefinite span of service—no matter how severe the service or how heavy the abuse.

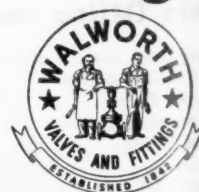
Thousands of users prefer the Walco as the safest, strongest, most useful pipe wrench made. The Walco wrench is a product of the Walworth Company, manufacturers of valves, fittings and tools for over a century.



The Walco wrench is made in lengths of 6"—8"—10"—14"—18"—24"—36"—and 48". The 6" and 8" sizes have integral lower jaw.



WALWORTH
valves AND fittings



LOOK AT THE RECORD ON UNDERGROUND BELTS

MORE MINES

are equipped underground with Goodyear conveyor belts than with any other kind

MORE MILES

of Goodyear conveyor belts are used in underground mine haulage than any other kind

MORE TONS

are hauled, both underground and topside, on Goodyear conveyor belts than on any other kind

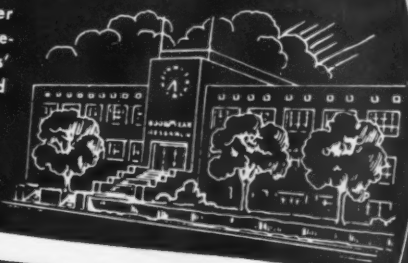
THESE three facts tell you what veteran mine operators think about Goodyear conveyor belts for underground service. Goodyears are first choice because experience has proved them *first* in performance, economy and long life. Yes, there are reasons — *more than a dozen of them!* Get the full story, fact by fact, from the G.T.M. — Goodyear Technical Man — before conveyerizing underground. To bring him to your office, write Goodyear, Akron 16, Ohio or Los Angeles 54, California — or phone the nearest Goodyear Industrial Rubber Products Distributor.



GOODYEAR INDUSTRIAL RUBBER PRODUCTS
backed by

20 YEARS' EXPERIENCE IN SYNTHETICS

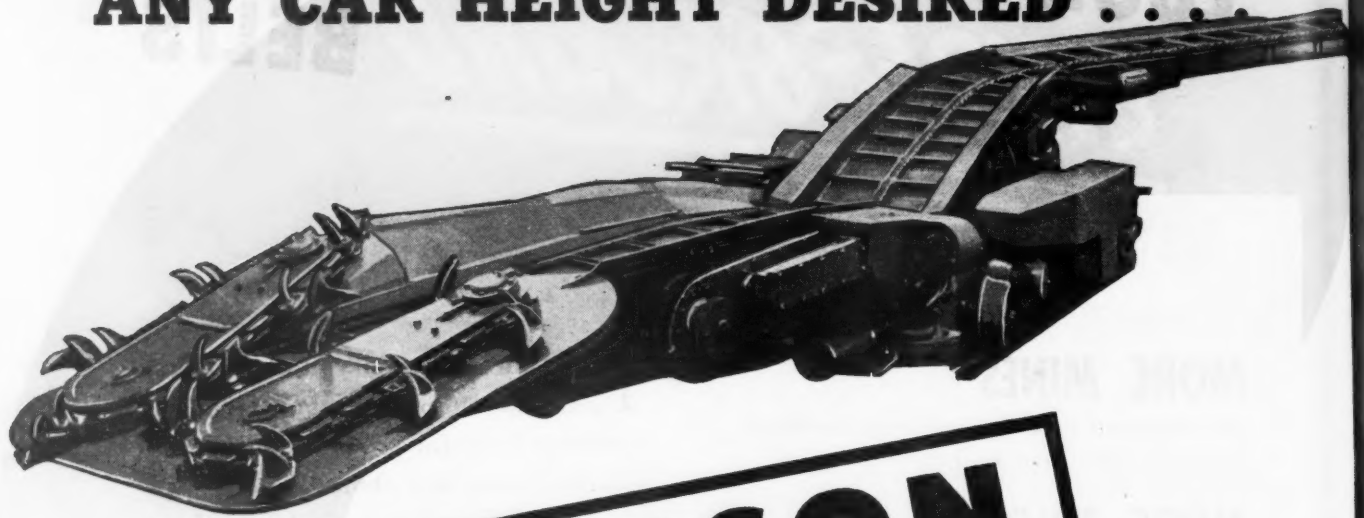
Goodyear belting, hose and other products for mine use are benefited by Goodyear's twenty years' experience in developing and improving synthetic rubber, and the vast technical resources of the Goodyear Research Laboratory, the finest in the industry.



GOOD YEAR
THE GREATEST NAME IN RUBBER

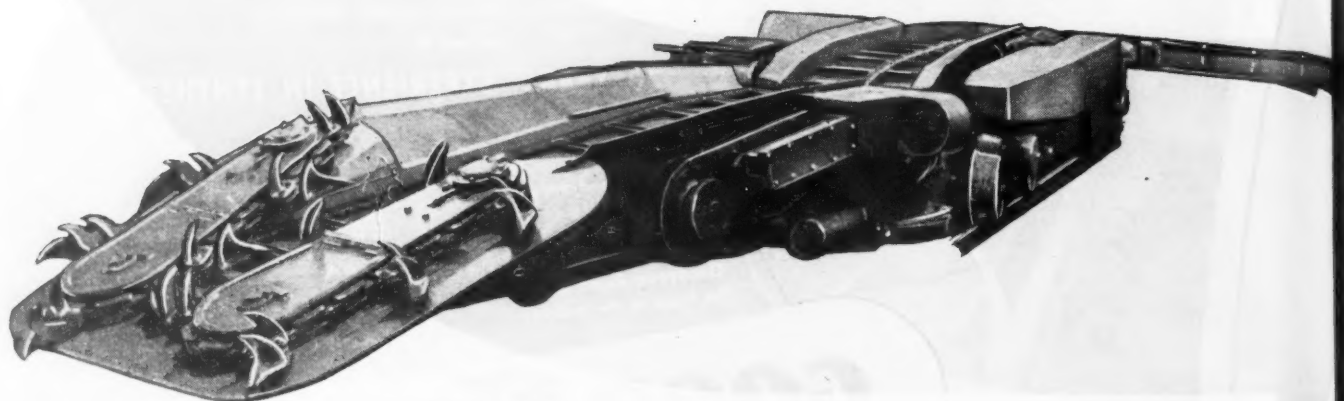
BUY WAR BONDS • BUY FOR KEEPS

CLARKSON REAR CONVEYOR ELEVATED INSTANTLY TO MEET ANY CAR HEIGHT DESIRED



CLARKSON Universal LOADER 24 BB TRACK MOUNTED

Operator handles all controls from one control point. He easily follows the floor of the mine by simply adjusting digging head as the work proceeds. Tight corner shots are dug out perfectly.



REAR CONVEYOR FLEXIBILITY FOR LOADING OF LOWEST MINE CARS

LOADS 'EM
high
AS THEY COME

★ The rear conveyor on a Clarkson 24 BB is designed so that the tail end rests on the ground when not in operation. This feature in design keeps the tail out of the trolley wires even in very low coal.

Instant adjustability of the rear conveyor by means of a large telescopic hydraulic jack gives you the advantage of both high and low car loading—easy, fast, and at truly low cost. Another feature is that the conveyor can be adjusted horizontally with the car also.

Made for 38-inch coal and over, this lowest track loader on wheels has unusually wide range of application. It will prove valuable in helping to move that coal with greater speed, thus giving you that increased production so essential today. Low maintenance, flexibility, ruggedness, vertical or horizontal adjustment. Send for complete details.

Lowest
LOADING
MACHINE ON WHEELS

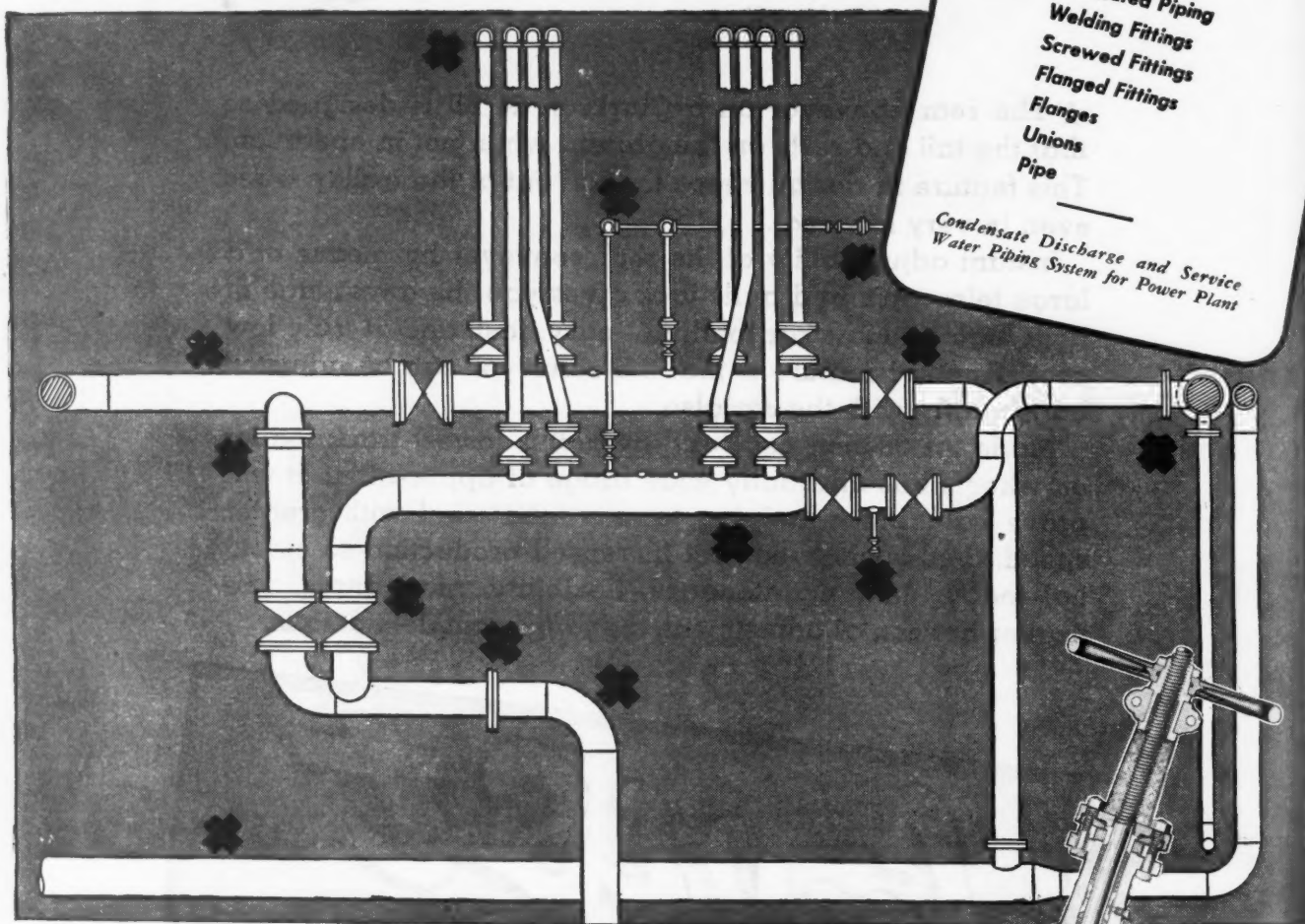
The **CLARKSON**
MANUFACTURING COMPANY
NASHVILLE ILLINOIS

Piping systems...any kind...for any service CRANE equips them fully

ONE SOURCE OF SUPPLY... ONE RESPONSIBILITY FOR ALL MATERIALS

No matter what your needs in piping equipment—whether for power or processing systems—all the benefits of single source supply can be yours. Pipe, fabricated piping, valves, fittings—down to the last accessory are available from Crane. You choose exactly what you need—from the world's largest selection for all pressure-temperature classes.

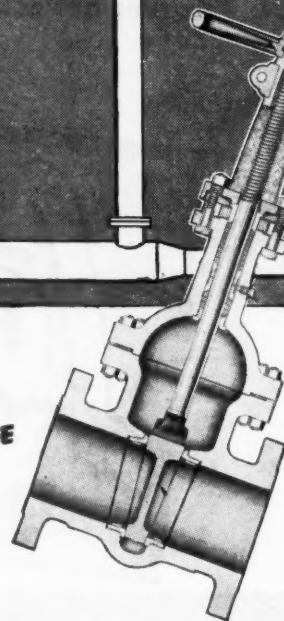
Ordering—keeping of parts stocks—maintenance—such operations are simplified if you Crane equip. More important, one responsibility for quality and craftsmanship of piping materials is a primary aid to good installation. Crane meets that responsibility with a record of 89 years' leadership in the piping equipment field. CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill.



ONE STANDARD OF QUALITY

Equipping completely with Crane materials insures one high standard of quality in every part of piping systems. That dependable quality is exemplified in Crane Steel Gate Valves: Finest flow behavior results from their straight-through ports. Severest line stresses are overcome with rugged bodies. Smooth operation is maintained by a ball-joint type stuffing box gland, strong tee-head disc-stem connection, and ample stem bearings. Positive seating is aided by extra long guide ribs.

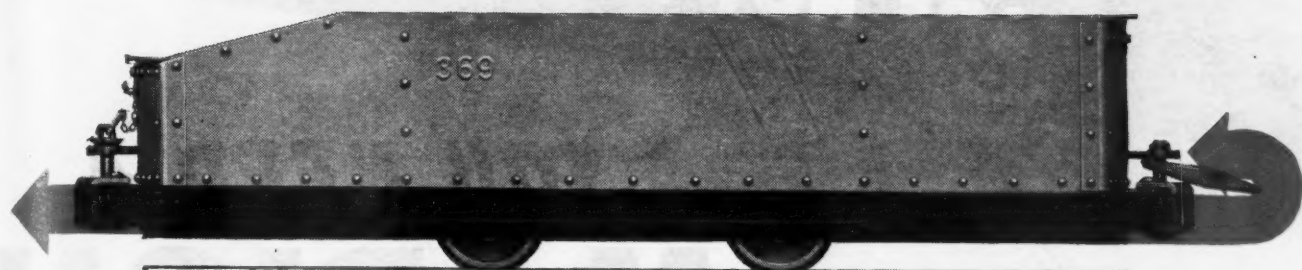
CAST STEEL
WEDGE GATE
VALVES



CRANE

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

NO MORE PULLED-OUT ENDS



PULL... becomes... PUSH
in this New Mine Car



Ever see an elephant power a circus wagon out of the mud? A wagon that was mired to the hub caps?

The elephant generally gets behind the wagon and pushes—for, if he were harnessed to front end or axle, the great beast might easily yank some part from its mounting.

Recognizing the soundness of the "push" principle, Bethlehem has applied it to its new mine car with the floating drawbar. The drawbar runs free, or floats; force and shocks are transmitted to heavy buffer springs at the rear. These draft springs are placed *outside* the car, so that the final application of force is not a pull but a push.

Car ends cannot pull out; no strain is concentrated in any one unit of a train. The force is well distributed, evenly transmitted from one car to the next.

Furthermore, the outside location of the draft springs prevents their coming in contact with the coal—a feature that protects them against corrosion. As a result, the hazard of premature spring failure is practically eliminated.

Bethlehem wrought steel wheels add further durability to this new mine car. Thus, from the ground up, the car is constructed to give you years of trouble-free service. Ask Bethlehem engineers for further details. Write to Bethlehem Steel Company, Bethlehem, Pa.



★ ★ ★

★ ★ ★

FOR EXTRA LONG REACH AND
Where **CRAWLER MACHINES**
ARE NOT ADAPTABLE

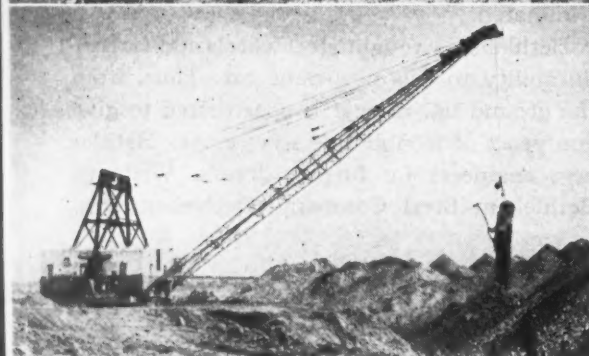
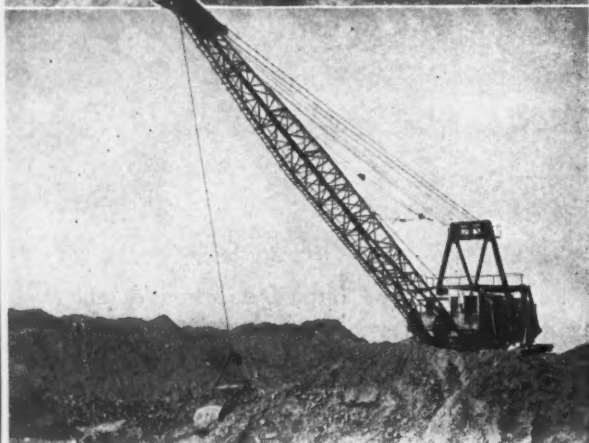
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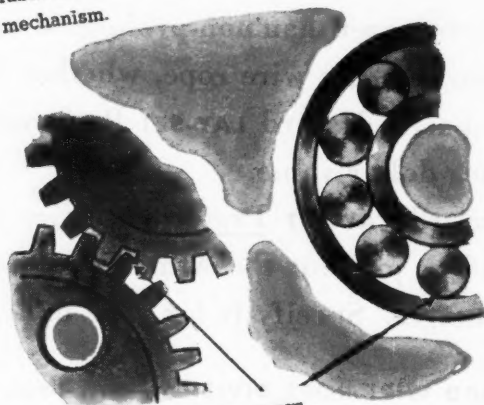
EXPLANATION: Mechanisms such as gears, anti-friction bearings operate with both a rolling and rubbing action. The areas of contact between the gear teeth, or in the case of the anti-friction bearings, between the rolls or balls and their races, are extremely small, hence unit pressures may become very great, often in the region of four or five hundred thousand pounds per square inch. Under these conditions of loading, and as rubbing velocities increase, mineral oils regardless of viscosity are unable to maintain an unbroken fluid film of oil between the relatively moving parts. The metals in contact each being made of steel are not in themselves good bearing surfaces. The result is that when metal to metal contact occurs, high local temperatures develop, resulting in incipient welding of the metal parts in contact. As motion continues, they tear apart resulting in scored surfaces on the gear teeth, rolls, balls or races.

By adding certain compounds to the oil (usually compounds containing sulphur, chlorine or phosphorus), an "Extreme Pressure Lubricant" is evolved. When sufficient local heat is developed by contact of the steel surfaces, the additive in the Extreme Pressure Lubricant decomposes. The active ingredient is liberated and immediately reacts with the steel surfaces at points of contact, forming a new and softer sur-

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NOTE: Extreme Pressure Lubricants do not perform as such between bearing surfaces other than steel on steel. For the lubrication of worm gear drives, where bronze on steel is utilized, the relatively soft and good bearing metal "bronze" operating against the harder "steel" provides an excellent condition of "solid lubrication". This only requires a lubricant that quickly removes heat and prevents softening of the bronze. A straight mineral oil or a mineral oil containing a small quantity of fatty oil is the lubricant most generally used in this type of mechanism.



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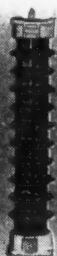
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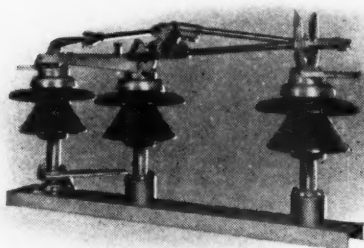
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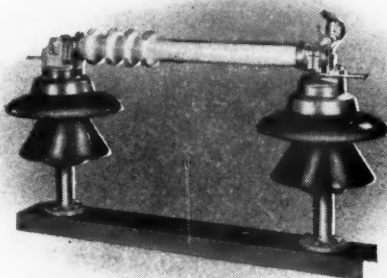
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AND QUARRIES



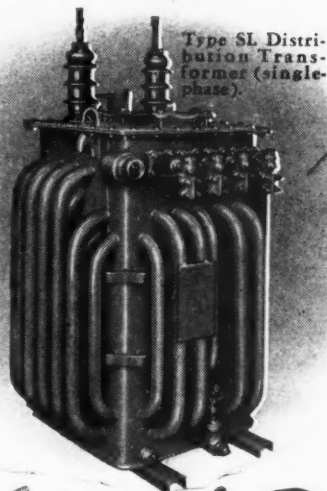
Type LV Lightning Arrester



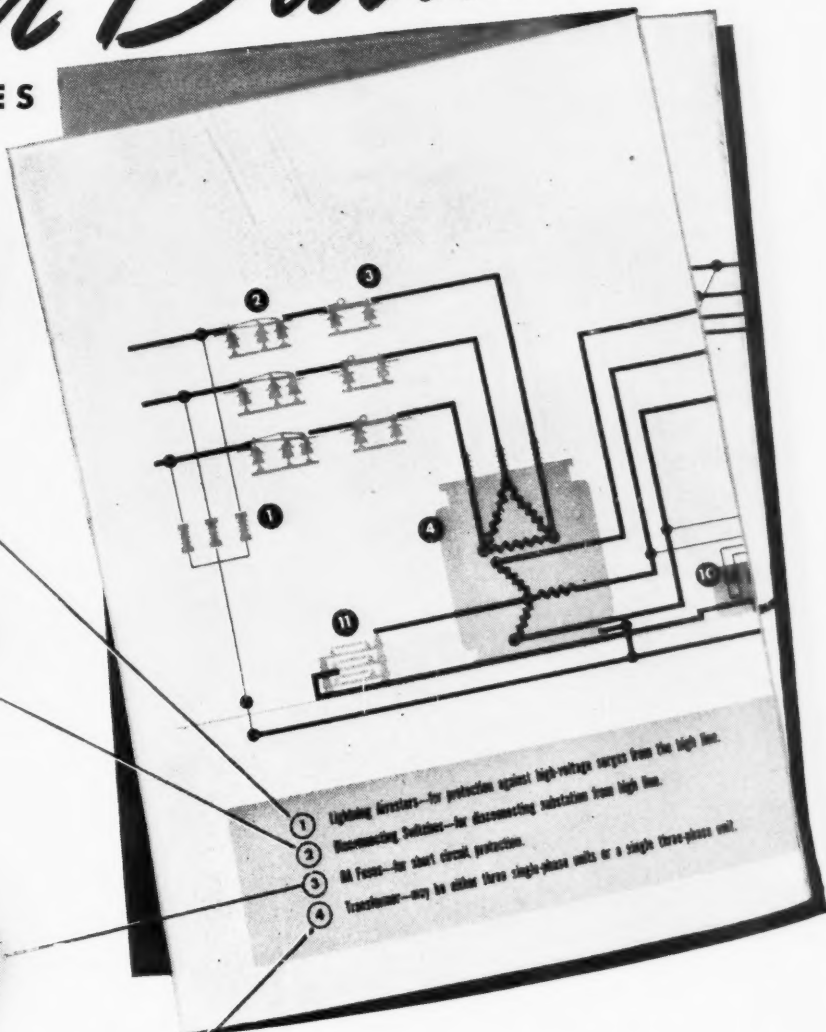
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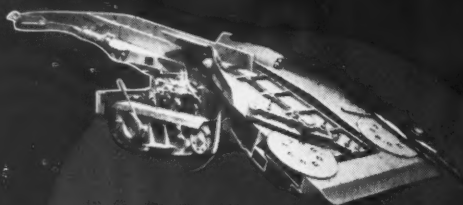
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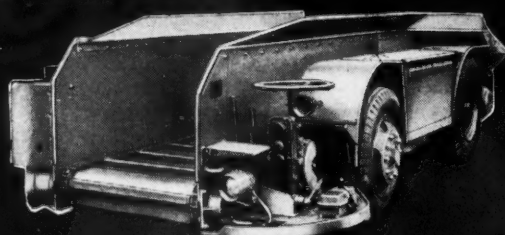
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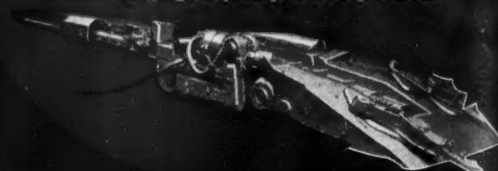
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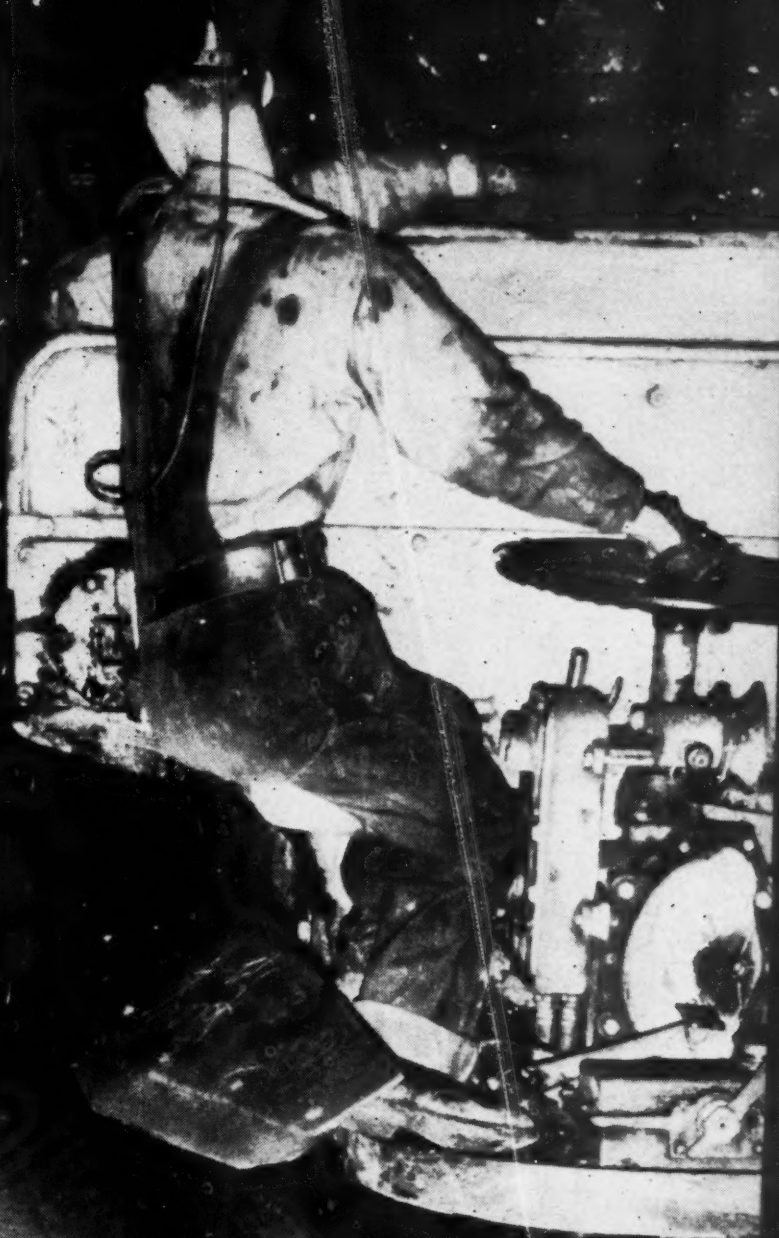


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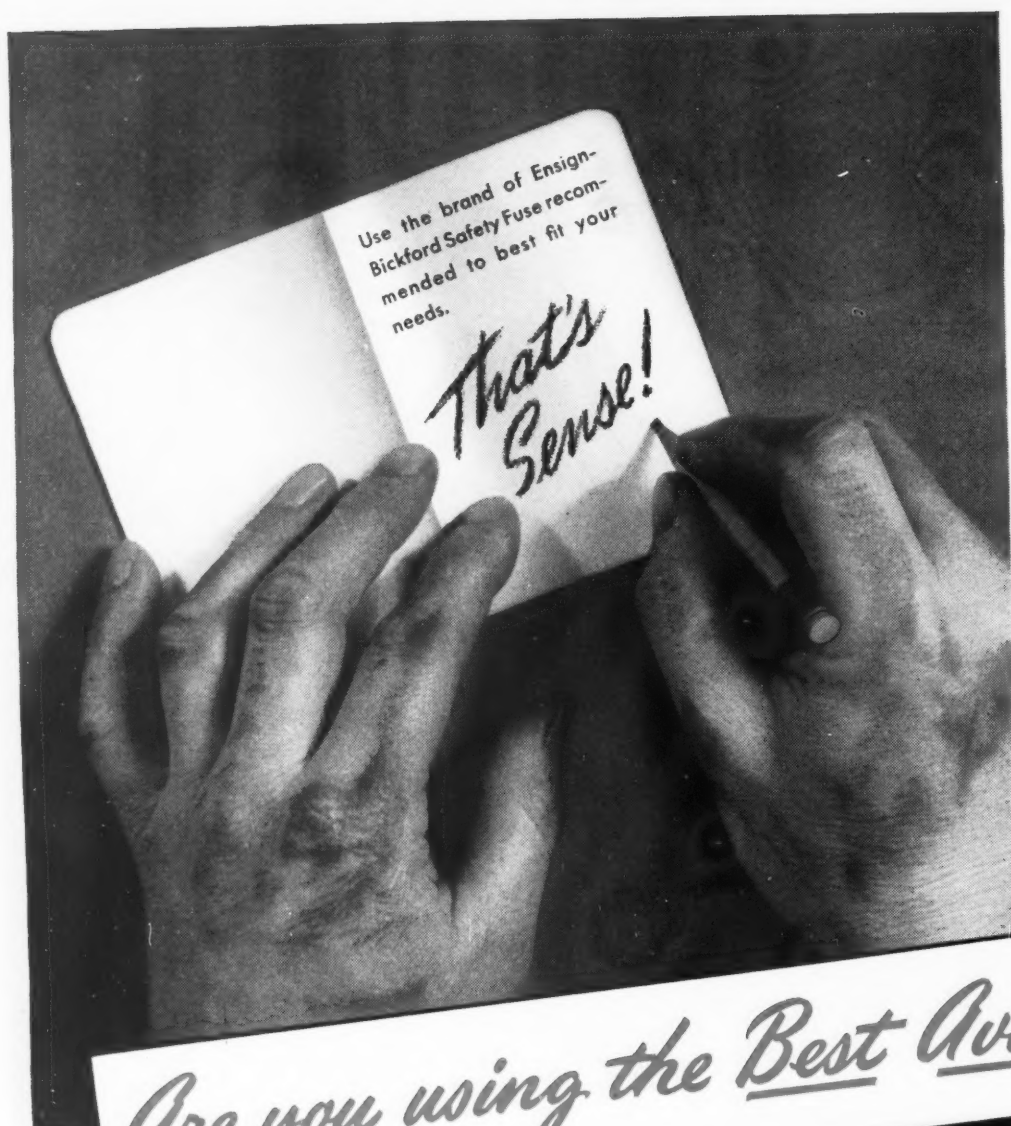


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Many improvements and advantages are offered in newer fuses such as the waterproof Orange Wax Clover and Black Wax Charter Oak brands. The Clover and Charter Oak brands have a slower rate of burning than the older brands such as Single and Double Tape, Beaver and Crescent. You may find it well worth while to consider a change when you next place your order with your supplier.



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Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, Editor

July, 1944

End and Beginning

WITH THE END of Act II of the "Seizure Follies" in sight at the first of June there were few to lament its departure from the boards. But in its run of 13 months it established several new and peculiar precedents. One was grabbing the property of an industry to settle a labor dispute despite the fact that the owners of that property were not at fault. In the coal case, in fact, the defiant parties—the officials of the United Mine Workers—were actually rewarded for that defiance by being granted much of what they demanded on the apparent theory that since they asked for it the machinery of government should be worked over to see that it was forthcoming. Only the captious, perhaps, would say that a fair and square compromise would have left coal and, more important, its customers and the public in a better position than the thinly veiled subterfuges which figured so prominently in the surrender of the government. And when pondering on the tender treatment accorded Mr. Lewis one inevitably wonders how much more hardly coal operators would have fared had they been the recalcitrant parties. One suspects that they would have received even shorter shrift than they did in the course of the horse-trading.

Some government officials point out that seizure ended the stoppages that were threatening the war effort in 1943. Once again, it perhaps would be only the captious who would read into some government announcements the inference that the employers were preventing a settlement and who would point out that perhaps the government could not, after all, claim too much credit, since, having taken the power to meet or compromise the union leaders' demands out of the hands of the employers, it necessarily also relieved them of the responsibility for the stoppages. Perhaps, further, coal might heave a sigh of thankfulness that its trip through the New Deal star chamber did not—at least so far—result in even more scars.

Be that as it may, the next thought should be of the future. At the moment it is difficult to say what else Lewis might have up his sleeve, but it should surprise no one if something came out of a mind that has amply demonstrated its ability to originate new issues. Also, it is not too long until a new agreement will be coming up, even if Lewis is unable to hatch anything in the meantime. The question is: How well will

coal be prepared to play its proper role in the new negotiations to come next year?

Not to put too fine a point on it, coal operators have been at a substantial disadvantage in negotiations for several years, and the disadvantage has become even more apparent as the government has preempted a larger and larger role in the settlements. The union negotiates through one man with full authority, with various government agencies and officials ready to come to his aid with or without an invitation. While the coal operators probably cannot expect the same sympathy from government, it seems logical that they should have a corresponding spokesman or representative body with full authority. Perhaps a one-man negotiator for coal might seem a radical departure, but it has possibilities—great possibilities, in fact. But whether it is one man or some other set-up, coal needs to start preparations now if it is to have a reasonable chance of making itself heard in the negotiations.

What It Takes

SAFETY pays off. No matter how it is put, that is what it boils down to. It pays off not only in preventing death and suffering but in cutting the cost of coal. The champions have proved it over and over. What makes a champion? There may be other yardsticks, but a recent issue of the Pittsburgh Coal Co. "News" listed the following:

Superintendent or mine foreman—at least 65,000 tons per compensable accident each year for three successive years.

General assistant mine foreman, assistant mine foreman, transportation foreman or master mechanic supervising 10 or more men, outside foreman supervising 50 or more men—36 successive months without a compensable accident to a man.

Master mechanic, 5 to 9 men, exclusive; outside foreman, 10 to 49 men, inclusive—48 successive months without a compensable accident to their men.

Are the standards too high? That same P.C.C. "News" published a sizable list of champions. The more coal mining can add to the list and the more concrete evidence it can offer of having discharged its responsibility for eliminating injuries and loss of life, the easier it will find the road to complete acceptance of coal as the nation's No. 1 source of fuel and energy.

TOMORROW'S MINERS

Where will they come from? How recruited? How started in mining?



WHO'LL TAKE THEIR PLACE? Skilled manpower was becoming a coal-mining problem even before the war. It bids fair to become even more of a

problem in the future. The time to begin solving it is now. Proper recruiting and training measures are seen as the answers.

By **JAMES R. SUTPHEN** Assistant Editor, Coal Age

THE END of the war will not necessarily mean the end of coal's problems in manpower—in manpower to produce the coal and in manpower for essential management and engineering functions. The tight wartime pinch, of course, will be eased. But are numbers the only criterion to be used in judging the manpower outlook? True, it is a vital factor, but a realistic appraisal of the industry's course must make the answer no. The accent now and in the future will be on mechanized mining and preparation. Will the men, bosses and engineers qualify to use such equipment for highest efficiency and maximum safety be available?

While not troubled by lack of numbers coal was beginning to feel

the effects of lack of qualifications for modern mechanical operation even before the war. This problem undoubtedly will grow more serious in the future as mechanized mining increases, especially if the tendency of possible recruits to seek careers in other industries still runs as strongly as it has in the past.

Solution Not So Simple

Stating the problem is infinitely more simple than solving it: not enough young men are entering mining. Coal men who have studied the problem advance two major reasons for this failure. First, and by far the more important, the opportunities in coal have not been widely enough or attractively enough presented to tempt

young men to go into mining. Second, and more earthy, too many young men these days are afraid to get their hands dirty, especially if they are under the impression that the rewards are relatively meager. It seems evident that if the opportunities for decent living and advancement in coal are properly presented, the kind of men that coal wants as its backbone in the future won't worry about dirty hands.

Assuming that a problem exists, and the evidence certainly warrants that conclusion, the nature of the problem indicates the solution. First, every effort should be made to present coal's story to young men when they are ready to take jobs and start earning a livelihood. Second, provision should be made for giving young men who

MINING MANPOWER—A Suggested Approach to the Problem

1. GET THE FACTS!

Analyze future operations and forecast needs for engineers, trained managers and supervisors and skilled workers.

2. TELL THE STORY!

Visit and talk to students in high schools and colleges and show them the opportunities in coal.

Carry the message to the community and to possible recruits by advertising through newspapers, radio and other mediums and by appearances before young men's organizations, service clubs, church organizations and other civic or community groups. Motion pictures might help.

Set up coal exhibits at schools and colleges and in community centers.

Arrange for mining tours for students and the public in general, perhaps through the medium of a show mine or section open all the time.

Engage high-school and college students for summer or vacation work.

3. GIVE THE NEW MAN A GOOD START!

Work for and cooperate in the establishment of mining courses in regular and vocational training schools.

Support and cooperate in setting up vocational training and upgrading schools for men past school age.

Establish, as an alternative or a supplement, training centers for new men to give them the right start in mining, maintenance, electrical work and safety.

elect coal mining the right start in the industry.

The right start in coal mining takes in a number of things. It includes adequate pay, maximum opportunity for advancement and interested, sympathetic handling of young engineers and other young men destined for engineering and managerial positions. And for men who will man the mines it includes, if possible, an opportunity to acquire some knowledge of the working of coal and its possibilities before they finish their schooling. And, in the opinion of a growing number of coal men, it should include a short pre-work induction and training course. In this training, under actual shop or mining conditions but in an atmosphere devoted not so much to production as to learning, qualified, sympathetic instructors have an opportunity to give the newcomer the right grounding in what it means to mine coal, to teach him how to handle the job or jobs he may be assigned to and, above all, to get him into the safety habit. Then, if he is passed on to a boss who understands how to lead neophytes into efficient, safe mining, the newcomer is much more likely to be and remain satisfied.

Sporadic efforts have been made in recent years to attract high-school and college men to mining. The war not only complicated them but in a way made them somewhat academic. What sense, some have reasoned, is there in attempting to attract and train a high-school student in handling a mining machine if, on reaching 18, he is going to put on a uniform instead of a

hard hat? But there is a little more to it than that. If this young man were sold on coal mining and had received some training, would he not be more likely to turn back to coal when he finishes his tour of service? Then there is the future. To ask another question: is it better to set up facilities for recruiting and training new men now rather than attempt the job in the heat of a critical shortage?

Bring New Workers

Vocational guidance—another name for attracting and pre-training of men—is an entirely different matter from upgrading of workers and supervisors, a task which many a company already is discharging in commendable fashion. The vital difference is that vocational guidance and training has to start a lot earlier. Valuable as upgrading is, it brings no new workers to coal and that, many coal men agree, will be an important postwar problem. To repeat, all the evidence indicates that the sooner coal goes in for vocational guidance and training the better. Not only will it have some immediate benefit in supplying badly needed workers but it will give coal a chance to bid for the services of men now coming out of the armed forces, as well as a chance to bid for those who will become available in the future, either as a result of demobilization or graduation from school or college.

World War II will accomplish one thing as an outgrowth of its unparalleled destruction. It will furnish an army of men with technical skills highly useful to American industry,

including coal mining. But unless a real effort is made by coal, the indications are that these men will look to other industries which are well aware of their qualifications and will welcome them. Since Pearl Harbor, some 750,000 men have been discharged from the armed forces. Only 11,000 of them are battle casualties. How many of these men have returned to coal mining or have been persuaded to make it their livelihood?

Vocational guidance and vocational training are never easy jobs and this applies especially to getting them established. Results are not immediate and may be difficult to measure with a yardstick, although there is no question but that they are substantial. Courage and a resolve to stick to it, therefore, is a necessary prerequisite to vocational guidance and training. Furthermore, courage and resolution must be accompanied by a concrete, long-term plan, since sketchy or scatter-shot methods may be worse than none at all.

The problem might arbitrarily be divided into two parts: A plan of attack and a method of carrying it out. The plan involves getting coal's message over to possible recruits wherever it is likely that they can be found. It hooks up, incidentally, with the broader subject of public relations for coal mining. Anything that is done to improve a possible job seeker's opinion of coal mining inevitably will improve the opinion of his parents, relatives and neighbors. Recruiting efforts, therefore, can help the industry materially in its dealings with the public

in addition to insuring an ample supply of good men.

Doing the job might also be divided into two parts. One is taking the message to the man and the second is giving him the proper start when he shows up for work. This brings up the question of whether individual companies should establish their own programs or whether such work should be a cooperative enterprise. A hard-and-fast answer, naturally, is difficult to make. If a coal company is large enough to warrant establishment of a well-staffed recruiting and training organization, it might elect to carry on its own work. In most cases, however, it seems logical for local operators' associations to handle such matters in cooperation with federal, state and local vocational guidance and training authorities, the mine workers' union and other interested parties.

Envisage Cooperative Set-Up

Some have envisaged a cooperative set-up about as follows: The operators' association, in cooperation with the officials of the union district or districts, forms an organization to handle both recruiting and training. The head of this organization, or leading operators and union officials, sets up a schedule of regular visits to schools and colleges to point out the opportunities in coal mining and discuss the matter with any young man who may be interested. This same organization prepares motion pictures, exhibits for schools and community centers and radio and newspaper advertising. It arranges tours of mines and mining communities for interested men or groups and possibly makes arrangements for a show mine to which the public is welcomed at all times and taken on guided tours. It makes every effort to interest possible employees in taking summer jobs and in general takes care of the task of getting coal's story over to the public and the men it would like to hire.

This same organization also would take over the responsibility of seeing that new recruits got the right start in coal mining, especially men who would man the mines. For mine workers, it might conceivably arrange for a student working section in some easily accessible mine. This section might be equipped with the major types of loading machines, conveyors and the like used in the field so that new men could work with the equipment they would be likely to use. With a properly qualified instructor, the new men would get not only an idea of how mine work is carried on but would be thoroughly grounded in safe working habits.

Maintenance and electrical training might be handled in similar fashion, perhaps in a shop where one of each type of equipment in the field would be brought for repair and demonstration. Or such men might go directly to the mines with the understanding that special provisions would be made for giving them preliminary instruction. In the case of lathe operators and others going into similar highly skilled jobs, channeling them directly to the mine shops equipped to provide such training might be the only alternative unless training were given before the young men left school. This latter method of securing training of electrical, mechanical and repair men, in fact, might be the best way out. A number of organizations lean in that direction at least, although some companies have undertaken such training themselves.

Among those now engaged in stimulating pre-graduation training are the Pocahontas operators. These operators, in cooperation with federal, state and county vocational representatives, reached a decision no later than March 13 to add a course in repair and maintenance of mining equipment to the current program of the vocational schools in Mercer County, West Virginia, and were moving forward on a similar program for McDowell County. The maintenance course, it was announced, would be approximately three years in length, starting in the tenth grade of school.

Get Summer Experience

An example of company training in repair and machine work is furnished by the Hanna Coal Co., operating in eastern Ohio. For many years, Hanna, like other companies, has recruited college men for its engineering and managerial forces. They had been given summer experience to familiarize them with coal mining and its opportunities. Some stayed, others dropped out. One of the principal reasons for departure was reluctance to start underground and learn the business from the grass roots, although those who stuck have risen to important managerial and engineering positions. All in all, despite departures, which also occur in any other line, the company's program has resulted in a substantial net gain in qualified personnel.

But recruiting engineers and managers was only part of the problem. More important, even in pre-war days, was enlistment of men for work at the face and for training as mechanics, electricians and repairmen. Hanna opened up an entry at Willow Grove mine as a student working place, installed equipment and headed into

training. This step worked well until the war broke out. Then it became as much or more of a headache to keep old employees than to find new ones.

Training work, however, went on and in conjunction with the Ohio Coal Association and District 6 of the United Mine Workers, a school was opened at St. Clairsville. In large measure, the school was devoted to upgrading of workers, but it also was a start toward reviving the vocational guidance and training in which Hanna and others were interested.

Hanna Foremen Teach

The State of Ohio furnished the money for instructors—who were largely Hanna foremen—in maintenance, machine-shop work, welding and electricity. The school started on a three-shift basis with 40 to 50 men attending. But that dropped considerably because only one instructor was available at a time and unless the men were interested in what he was teaching they did not attend. Machine-shop practice attracted the widest interest, with a loading machine as a guinea pig, and from that course of five nights a week for two months Hanna obtained five trained men who are still on the job.

Largely because the number of instructors available was limited and because only one thing at a time could be taught, interest waned until at the end of the course only six or seven men were left. That small number made it inadvisable to continue, but the experience provided much valuable data and guidance for the future, when it is expected that the project will be revived, if not for recruiting face workers at least for training mechanics, electricians and repairmen.

When Hanna opened its new central machine shop at Georgetown last November (May Coal Age, p. 67) it also started its first class of apprentice mechanics through the process of learning to operate machine tools—first step toward becoming a member of a Hanna repair or rebuilding crew. None of these men had ever been in coal mining before. They were recruited by newspaper advertisements, by word of mouth and by personal interview. A few were sons of miners. One was the son of the prosecutor of Harrison County. Most of them came because Hanna had gone to the trouble of pointing out the opportunities ahead of a good man in coal mining. Eighteen started the course; twelve are still on the job.

The classes, conducted on the night shift, are taught by a State Board of Education instructor paid with federal funds. But Hanna foremen super-



TRAINING IN ACTION—Foreman Hugh Steer shows two of the young men undergoing training at Hanna Coal Co.'s Georgetown shop how to set up a job in a lathe.

most of the actual machine-tool work. Three weeks is spent in the classroom before the new men go onto the machine-shop floor. After that, they work 8½ hours a day, of which 1½ hours is devoted to classroom studies and the remainder to actual work on machine tools. The course lasts one year. The men are paid a special trainee rate, with an increase of 5c. an hour every four months. Boys 16 years and over were eligible and about half of those who first applied were 18 or older. The younger were the ones who dropped out. The older were the ones who showed they really wanted to learn and applied themselves to the task.

The war undoubtedly has stalled many other worth-while vocational guidance projects for coal mining. One large Pennsylvania producer, for example, has already made its plans but hesitates to start now because of the fact that most of the boys trained for mining at the present time would be inducted into the armed forces, although it recognizes that if such training is given now there is a greater likelihood of these boys coming back to mining when hostilities cease. After the war, this company intends to go into guidance and training on a large scale. Its plans include opening a section in one mine as a model working place where high-school students may become acquainted not only with mining equipment but also with work underground and with good safety practices. In addition, speakers will visit schools and possibly motion pictures will be used to show the oppor-

tunities in coal for young men. The ultimate goal, still in the future but not impossible of attainment, is to have every face boss a high-school graduate.

Student working sections have been operated by a few mining companies in the past and have now been called upon to help meet the increased demand for men growing out of the war. In Utah, as an example, some 900 men have been trained in a joint program sponsored by the War Manpower Commission and the Carbon County operators, with instructors paid by the Utah State Board for Vocational Education. Classes are conducted in several mines where working sections have been set aside for training purposes. None of the trainees, it is stated, has had previous mining experience. Other mining industries, and notably a few companies in metal mining, have found student working sections of major assistance in insuring the right start for a man and thus guaranteeing that he will stay on the job and work efficiently.

The problem of the future, as stated, does not end with men for the face jobs. It also takes in men for possible engineering and managerial positions. Coal-company executives, it seems fair to state, have not been too prone to look to the future in manpower. A growing number, however, are thinking along these general lines: (1) making as accurate a forecast as possible of future needs for skilled men for the mines and other properly qualified men for salaried positions; (2) embarking on a program of setting

coal's opportunities before the public and before possible recruits; and (3) setting up facilities for giving new men, especially those that will go into the mines, the proper training and the right introduction to their new jobs. The details of carrying out the program may vary, but many authorities feel that it must include these three essentials.

The reasons for more work on the manpower question are not far to seek. For one thing, the industry so far is only approximately 40 percent mechanized. In view of the march of the machine through American industry, that figure is still low. Progress will accelerate in the future and the end of the war, in the opinion of many, will see a major increase in mechanized mining. As a result, the need not only for qualified engineers and bosses but also for skilled machine operators, mechanics, electricians and repairmen will increase sharply. A strong back will no longer be the sole key to a coal-mine job. And unless all the indicators are out of focus, coal should enjoy many years of profitable business—the best possible argument for new men entering the industry.

Must Brighten Prospects

But unless coal mining presents these prospects in attractive fashion, unless it goes after the good men that will be available after the war, it may find that the parade has passed it by. There is considerable truth in the observation of one coal-company personnel director: "Coal not only hides its light under a bushel; it literally buries it underground." Steps now under way undoubtedly will change that situation, but the more pressure is put behind them the sooner the industry will benefit from a higher regard from both the general public and the men it would like to have as its workers.

One of the best methods of achieving the high regard which means literally dollars and cents to every man in coal mining is good vocational guidance and training. Virtually every other major industry has exploited the possibilities fully and successfully. Radio, aviation, automobiles, chemicals, electronics—all have laid their advantages before American youth. Yet, without coal, they all would be pretty helpless. Coal is older than any of them, yet as constantly changing, as much a new frontier as any industry in the country. But youth is skeptical and has to be shown. That is both an industry and a company job. If it is done well, coal mining will be that much farther along the road to better service and greater prosperity.

Anthracite HAS a Future

By **ROBERT V. WHITE**

President, The Lehigh Coal & Navigation Co.
Philadelphia, Pa.



Photo by Bachrach

"Most people agree that anthracite, to regain its place as a premium fuel, needs to be made available to consumers to use with the same comfort with which the oil and gas industries have surrounded the burning of liquid and gas fuels. This is being accomplished through improvements in the types of automatic and semi-automatic anthracite-burning

equipment that have been made available. After the war, it is expected that the production and sale of this equipment will increase and that eventually anthracite will be lifted to the same level of consumer acceptability that its competitors enjoy."—From the 123d annual report, The Lehigh Coal & Navigation Co.

GOING a little beyond what I said at our last annual stockholders' meeting, I want to give some of the reasons why I have such confidence in the future of the anthracite industry. I see our "road to market" expanding into a broad highway because we are now, at last, all working together. The year 1944 will be a peak year. We have regained the markets lost in the past ten years. But we are not discounting the fact that much of this business has resulted from the scarcity of other fuels. Our problem is, then: How are we going to hold the gains?

Anthracite has made substantial progress in public and employee relationships and research. Public relations include relations with all groups, and one important medium yielding good results is advertising. Advertising which seeks to inform the

public, as well as employees and stockholders, of the policies and problems of a company has been doing a splendid job for anthracite. With this good start, the public will look to members of the industry with increasing confidence and trust—a hopeful sign for the future.

Know the Market

The development of new or greatly improved anthracite-burning equipment is of vital importance in retaining the present market. Research, of course, is going on all the time and has been for years. However, practical engineering research must have definite objectives and the industry is approaching the matter realistically. We must know what people want from anthracite-burning equipment. Then, it is safe to assume, research will provide it.

Leaders of the industry can, and should, devote a great deal of time and attention to this quest for facts that will help us serve the public better.

The road to increased markets, however, cannot be traveled by the producer alone. He must have a partner—the dealer. Actually, the extent of the markets we shall retain depends upon: (1) the soundness of our dealer partnership and (2) sale to the public of automatic and semi-automatic burning equipment, which must include removal of ashes and the providing of manual labor for hand-fired furnaces. These are the guide posts to the future.

What with all the necessary governmental restrictions and regulations, I think the newspapers, the department stores, the florists or whoever starts these things, should launch a nation-wide "Be-Kind-to-Your-Coal-

More
heating to do



...that's why coal is scarce

The ordinary anthracite-burning furnace was the first popular central heating plant. It is today the mainstay in millions of American homes—economical—dependable—requiring minimum attention from the householder. The shortage of other fuels has brought a widespread return to this practical heating unit.

But the years before the war saw a rapidly accelerated trend toward the use of mechanical coal firing devices. Highly efficient, they make the anthracite heating plant completely automatic. They stoke and remove ashes—a thermostat controls the drafts and dampers. They bring the same even temperatures and freedom from care provided by other automatic heater types—plus anthracite's low cost and constant reliability. The end of the war will start a tremendous demand for these mechanical furnacemen and widely increase the use of anthracite as one fuel of which availability is assured for many generations to come.

The present emergency finds anthracite called on to do an enormous job. As with steel, copper, gasoline and other commodities, war needs must come first. And anthracite must be supplied for thousands of additional homes, apartment and business places as allocated by the Government.

Lehigh Navigation Coal Company, which operates

the mines in Panther Valley and sells its products under the name of "Old Company's Lehigh," boosted production and shipped over a million more tons last year than in 1942, an increase of 33.84%. The Company's modernization program is in full swing. Its new machinery and methods have been a big help in producing more coal for six consecutive years. But it has taken hard work as well, and the present doubling of 1938's output reflects great credit on Panther Valley miners and their helpers. They have put in more days and longer hours—accomplished more with smaller numbers, for hundreds of young miners have gone to the armed forces.

Of this you may be certain always—that every ton of coal from Panther Valley sold under the "Old Company's Lehigh" trademark is good clean coal, long-burning and full of healthful heat. It is sold by dependable dealers who are doing their best to supply customers equitably according to Government allocations.

Lehigh Navigation Coal Company Inc. is a wholly-owned subsidiary of the Lehigh Coal and Navigation Company. It is one of a group of enterprises so owned, which are notable for the efficiency and usefulness of their service to the public.

Lehigh Coal and Navigation Company



PROBLEM AND PROMISE—What anthracite's job is today, how it is being done and what its users can look forward to in the way of convenience and economy are the keynotes of this good-will-building message appearing in metropolitan newspapers.

Dealer-Week." The dealer does not expect any such touching regard from the consumer, but he certainly is entitled to sympathetic treatment from somebody.

How About Service?

The dealer knows full well that anthracite users depend upon him for all fuel needs, even to the extent of interpreting any and all rules and regulations. Or does he? We know that most of our dealers are aware of the importance of service, but "service" these days takes on a new meaning. To get the idea across we are running "A Message to Coal Dealers" each month in trade papers.

One such message was "How to Keep Friends and Influence People."

It read in part: "Government regulations, effective now, provide that

each of your customers, before he can get anthracite from you, must file with you a 'Consumer Declaration.' This is intended, in so far as possible, to prevent the inflation, duplication or pyramiding of orders—to effect a more equitable distribution—to assist you in supplying everyone within your ability. So far, so good.

"But: this declaration is, in effect, a 'Consumers' Declaration of Dependence' on you, their Lehigh Navigation Coal Co. dealer. Many of them, in warm weather, will be, to a considerable degree, unconcerned with far-away October's change in season. They will be depending on you, and you will be helping them—and yourself, too—if you will use every trump you have to bridge the gap between spring and winter weather. Urge them by phone, letter or public announcement to file

their declarations with you. The more who do this—and the more who place spring and summer orders with you—the more will call you friend when cold sets in again and when deliveries may be delayed."

By keeping our dealers well informed and supplied with all the coal we possibly can produce, we are attempting to lay a real foundation of dealer partnership. And by trying to anticipate and help with their problems, we are building on that foundation. Our production last year was one-third more than the year before, and in the past five years our coal output has increased more than 112 percent. We expect to increase production again this year.

I have emphasized the importance of the producer-dealer relationship, which seems to me to be the best foundation for planning future merchandising steps. The greatest contribution that can be made in this direction is the development of a wide range of highly automatic and semi-automatic coal-burning equipment and its introduction in the territory where anthracite has its market. The pioneering work to this end is now being carried out by two organizations—Automatic Coal Burner Co. and its subsidiary, Furnaceman, Inc.—which are being backed by four anthracite producing companies, including ourselves.

Two Cities Chosen

These companies have opened the campaign in Lansdowne, Pa., and Albany, N. Y., selling what equipment is available, repairing and modernizing existing equipment and providing coal-firing and ash-removal services. Automatic Coal Burner sells and services equipment. Furnaceman, Inc., renders to every householder today the sort of service only the fortunate could have had in former days—a private furnace and "handy" man. It renders manual services, including furnace tending and ash disposal, both in residences and in other buildings using anthracite.

We chose these two typical communities—that is, typical from the viewpoint of anthracite users—so that we might study the problems to be met. We have had, also, a considerable hand in advertising and publicizing the services to the consumer. In short, we are making an intensive study of both operations in both cities, and our findings to date have convinced us that this is one important anthracite development.

It is a little early yet (the operations are less than a year old) to make glowing claims, but we have learned that many people like the idea. Furnace-

man, Inc., offers eight propositions. I will give two examples:

PROPOSITION NO. 1—Care of fire and furnace and ash removal twice daily.

1. Fire heating unit twice daily.
2. Shake grates and remove ashes to containers daily.
3. Remove ashes to curb and return containers to basement weekly.
4. Lubricate all working parts as required.
5. Check water level in steam and hot-water systems daily.

PROPOSITION NO. 3—Care and cleaning of stoker-fed furnace and ash removal.

1. Fill stoker hopper or trim coal in bin as required to insure continuous feeding of coal to stoker.
2. Replace ash containers as required.
3. Remove ashes to curb and return containers to basement weekly.
4. Wire-brush and vacuum-clean internal surfaces of heating unit twice during the burning season.
5. Clean and lubricate all working parts of stoker and other heating accessories as often as necessary.
6. Check water level in steam and hot-water systems during each call.

Business for these two firms has grown steadily and the reports we get from customers certainly are on the right side. Our investment has contributed much in the way of good will. Most important of all, perhaps, we are preaching the gospel of anthracite service as never before. Incidentally, we have been using several women as furnace tenders. They, as well as the men, are bonded and reliable. What is more, they do their jobs in a friendly, neighborly manner, all building more good will for the industry.

Lehigh Coal & Navigation took an active part in organizing Automatic Coal Burner and Furnaceman, Inc., and we are particularly interested in the program. This step, we feel, is another evidence of the determination of the anthracite industry to hold and expand war-time markets by increasing the value of anthracite to the consumer.

BUILDING BUSINESS WITH SERVICE—With "We Make Anthracite an Even Better Fuel" its theme, this advertisement of the industry's newest service promotes automatic, convenient use for its product.



Let us
take care of
YOUR
Heating Plant

We'll take all the work **OFF YOUR HANDS!**

This is a new service. It is backed by a strong company interested in making anthracite coal the most satisfactory fuel you can burn.

We do everything from building a fire to taking away the ashes. If your furnace needs cleaning, we'll clean it. If it needs repairing, we'll fix it. If you want a new hot water heater, we'll supply it. *We'll tend your fire once a day or twice a day or as often as necessary to give you steady, economical heat.*

We have spare parts, and an expert repair service.

If you want **AUTOMATIC HEAT**

We can install a thermostat for you and (if you burn 40 or more tons of coal a year) an automatic anthracite stoker suitable to your special needs. We clean and care for stoker-fed furnaces and hot water boilers as well as for hand-fired ones.

Write, telephone or call. We'll be glad to look over your heating plant and give expert advice without cost. Our service charges are low and all our men are bonded and reliable. Remember—that our object is to make the burning of hard coal a pleasure and profit to you.

**• ASK YOUR COAL DEALER ABOUT US.
HE HEARTILY ENDORSES OUR SERVICE.**

FURNACEMAN, INC.

238 Washington Avenue

Telephone 5-7591

Albany 6, N. Y.

We make anthracite an EVEN BETTER fuel

SAFE TRANSFORMERS

Used Exclusively Six Years at Two Mines

Non-Inflammable Transformers Eliminate Fire and Smoke Hazards—
Cost of Moving Transformers and Feed Cables Is Small — Revised
Layout Shortens Distance for Power Lines, Ventilation and Travel

By J. H. EDWARDS

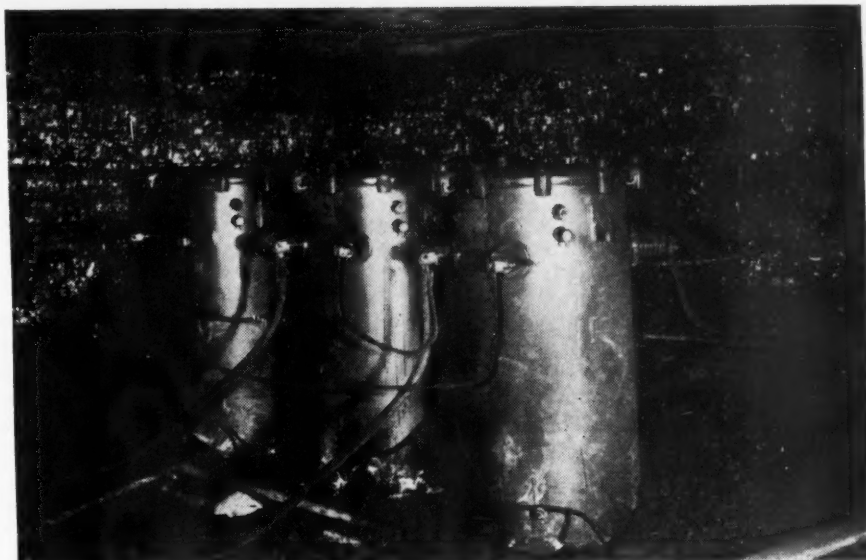
Associate Editor, Coal Age

RECENT CHANGES in power distribution at the two a.c. conveyor areas of the Carbon Fuel Co., Carbon, W. Va., focus attention on the success that company has had over a six-year period with 4,000-volt underground cable distribution and also with the exclusive use of transformers filled with non-inflammable liquid instead of oil. In the mine first opened, a cross entry turned to the right at a point a mile from the portal and driven to the crop now affords a short route for power, for air and for underground travel. Few if any other a.c. mines in the country are fully equipped with non-inflammable transformers. The early date of their selection points to foresight on the part of the company's engineers and officials. Prior to that (1930) this same company pioneered in West Virginia by completely mechanizing No. 9 mine with mobile loaders and a large cleaning plant (Coal Age, March, 1931).

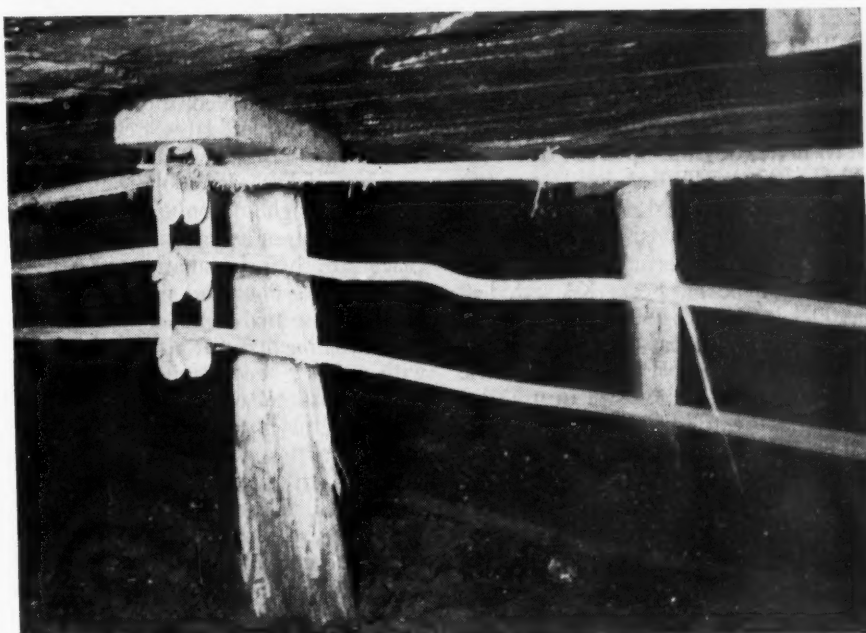
Trolley-Wire Hazard Absent

Both the a.c. conveyor areas are drifts into the Powellton seam lying about 20 ft. below the Gas seam mined in adjacent territory. Powellton seam thickness is 34 to 38 in.; rooms are mined 50 ft. wide and 300 ft. deep on 70-ft. centers and the coal is hand loaded onto chain conveyors feeding to belts to the tipples. Shortwall undercutters, drills, blowers and conveyors operate on 220 volts a.c. The trolley-wire hazard is absent. Locomotives hauling men and supplies are battery-powered. Both areas operate two shifts and the daily productions are now 600 tons. A considerably greater tonnage could be produced if the labor were available.

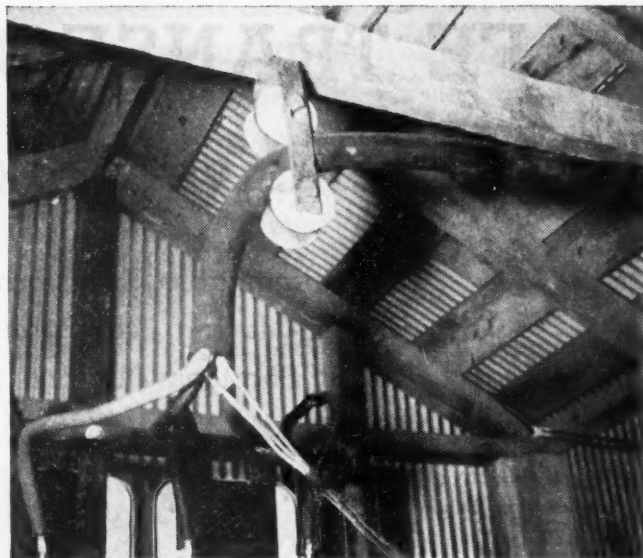
Each area has approximately a mile of main-line belt conveyor from active territory to preparation plant. In No.



A.c. substation on return aircourse in the No. 9 conveyor area. Typical for the installation of these non-inflammable-liquid transformers, construction of the substation involves taking only 12 to 18 in. of bottom for convenient height for up-ending the units to operating position.



Circuit installation for 220-volt a.c. power in a return aircourse in No. 9, consisting of three 300,000-cir.mil rubber-covered stranded conductors. On the bottom between the two lines of posts is a 4,000-volt three-conductor rubber-jacketed cable installation.



View at the top of the panel in the cable switch house at Abbotts Fork drift into No. 9. This is the "feed end" of the main underground 4,000-volt line. The three ground wires bunched to the right are connected to the panel frame and to an earth ground.

The vitreous tile leads into the drift near the tippie at No. 7. This illustration was made in 1938 soon after the mine was opened and shows how, during early development, the cable was put into use but left on the reel to save cutting and splicing. There have been no cable blow-ups in six years of use.

7, opened in 1937, mining began at the crop near the tippie and the workings have progressed over a mile. In No. 9X, put into operation last year, the first mile in by the tippie consisted principally of entry development for the main-line belt and a supply track. In the active territory of this No. 9X area the work differs from that in No. 7 in that an upper split of equal thickness above 3 to 5 ft. of firm slate is mined simultaneously and the intervening slate held in place by posting.

When No. 7 was opened (Coal Age, April, 1939), the first inside a.c. substation was installed 400 ft. from the main portal and consisted of three 25-kva. General Electric Pyranol transformers, Type II, Form KA, rated at 2,400-4,160Y/240-480 volts. The 4,000-volt power was conducted over a 1,000-ft. length of General Electric rubber-jacketed cable (still in use) ordered on the following specifications: "3-conductor, No. 4 stranded, 10/64-in. Versatol heat-resisting superaging moisture-resisting rubber with colored copper shielding tapes on each conductor, three ground wires equivalent in cross-section to No. 4 A.w.g., $\frac{3}{16}$ -in. 60-percent non-hygroscopic tellurium rubber jacket, 5,000-volt, Type RR."

As No. 7 mine developed, additional identical lengths of cable and also transformers of the same make and

types were purchased. Now there are in use in the two areas 30 of these Pyranol transformers and 10,000 ft. of high-voltage cable. Each mine has on the inside four sets of 25-kva. transformers (three per set) and on the outside one 15-kva. set. Although the two 15-kva. sets are now on poles where oil-filled units would be safe, the fact that they are non-inflammable provides a flexibility that will permit their being installed underground or in a building if later developments make a rearrangement advisable.

The 25-kva. Pyranol transformers are 38 in. high and only 12 to 18 in. of top or bottom is taken to provide a place for their installation. They sit on the mine floor and since the liquid is non-inflammable no concrete basin or dam is needed nor a fireproof room with special ventilation. In addition to the small excavation, the only construction for installation is a post to carry a short plank on which the 4,000-volt primary fused cutouts are supported. Metal brackets hold the cutouts away from the plank, eliminating danger of fire from that source.

Moving one of these transformer substations to a new location is relatively inexpensive. The vent hole of a transformer is temporarily sealed with friction tape and then the unit is tipped on its side on the sled on which

it is skidded to the supply track.

Primary cables are carried in the return aircourse and lie directly on the bottom. Their service record during the six years has been perfect. As previously stated, there has been no instance of an internal short or blow-up. The 1,000-ft. lengths of these rubber-jacketed cables insulated for 5,000 volts are connected through fused cutouts mounted on metal brackets similar to those serving the transformers. At each of the three mine openings where cables enter, the feed is through a switch house in which is a General Electric feeder panel with oil switch functioning with phase-failure and overload relays.

On the map (Fig. 1), a heavy circle on Abbotts Fork indicates the new opening driven out to crop to provide a short path for a cable to the No. 7 active section. Previously, all power for that mine came in via the portal at No. 7 tippie. In by of a belt drive unit, 1,500 ft. from that portal, the original cable was recovered for use in new locations. A new pole line now feeds the cable switch houses at the adjacent openings of the two areas.

Up Abbotts Fork a road has been improved for men on their way to the new portal and for delivery of supplies by motor truck to these drift openings. The fan for No. 7 was moved from

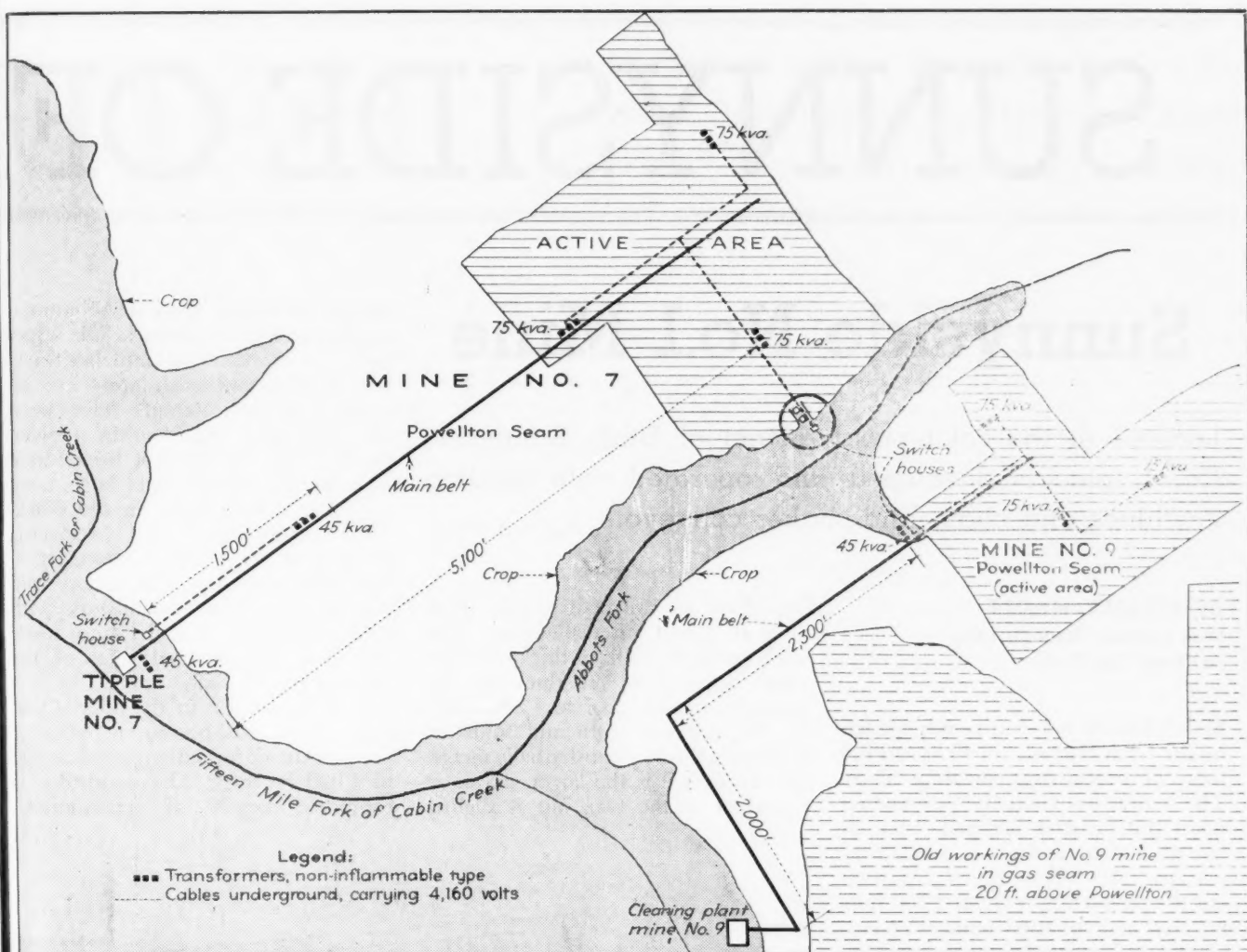


Fig. 1—Most of the power for Mine No. 7 now goes in the new 4,000-volt cable for use in No. 9, across the hollow. A new pole opening (circled) on Abbots Fork, a rearrangement that released line up Abbots Fork feeds the cable entrance for both mines.

near the tippie to the new opening indicated by the circle (Fig. 1). Underground travel for No. 7 miners has been shortened nearly a mile.

It is in order to explain that the voltages of 4,000 and 220 as used thus far in the article are nominal. Actually the primary voltage is 4,160 or more. The Pyranol transformer primaries are connected Y and the secondaries delta so that the secondary voltage at the substation always is 240 or more. The ground wires of the 4,000-volt underground cables are solidly connected to the neutrals of the Pyranol transformers, to their cases, to the panel frames in the switch houses on the outside and to earth grounds near these switch houses. Earth grounding at each of the underground transformer substations is not attempted because the mine is dry and there would be difficulty in obtaining a low-resistance ground.

To be certain of maintaining 220 volts or better at the face, the a.c. secondary distribution is limited to a total distance of 1,200 ft.; that is, 900 ft. from

transformers to room neck and 300 ft. in the room. Circuits to the room necks consist of three 300,000-cir.mil Anaconda single-conductor rubber-covered stranded cables mounted one above the other on spool insulators. The latter are held with removable bolts in metal stirrups hung from cap pieces and are spaced 20 ft. apart. The line of posts is placed near the center of the return aircourse and if a 4,000-volt cable is carried along the bottom in the same aircourse, it is placed between the first line of posts and another 4 ft. from it.

Floor or trailing cables furnishing 220-volt a.c. for drills, 5-hp. face conveyors and 50-hp. mining machines in rooms are United States Rubber No. 2 three-conductor rubber-jacketed cables. To avoid the complications of sectional connectors these cables are used in 300-ft. lengths. Surplus during the advance of a room is left in a figure 8 coil on the mine floor.

This reference to coiling reminds that the article in the April, 1939, issue of Coal Age, describing the opening of

No. 7 mine, included an illustration of the reel of 4,000-volt cable used to supply underground power for the first 1,000 ft. of development. This illustration is reproduced again in this article. As the transformers were moved ahead to new territory the cable was extended by disconnecting the feed, unwinding the reel and reconnecting. The load was small enough so that leaving the cable reeled could not cause overheating.

Rich Conley, who has been chief electrician of No. 7 since its opening, now has general charge of the electrical equipment for both areas. T. W. McGuire, Carbon, is mining engineer, and Carl Scholz, Charleston, is consulting engineer. The company operates five mines and in 1943 produced 1,310,000 tons. Executives and officials in general charge of operations are: C. A. Cabell, president; E. C. Hanna, assistant to the president; L. N. Thomas, executive vice president; George E. Brooks, general superintendent; and Arch Alexander, assistant superintendent.

SUNNYSIDE OF U

Sunnyside No.1 Mine

Located in the coking-coal district of Utah, Sunnyside No. 1 mine is developed and operated with loading machines and chain and shaker conveyors

By **WESLEY HYATT**

Mine Engineer, Utah Fuel Co.
Salt Lake City, Utah

SUNNYSIDE No. 1 mine was opened by the Utah Fuel Co. in 1900 and has been in continuous operation since. The output has fluctuated, depending upon the demand for coal, from as low as 200 to as high as 1,600 tons per day (two 8-hour shifts). At present the production is about 1,500 tons per day, and the total number of employees underground approximates 175.

The mine is located in the major coking-coal district of Utah. Other producers of coking coal in the same field are the Kaiser Co., Inc., operating the Sunnyside No. 2 mine in land leased from Utah Fuel Co.; Geneva Steel Co., operating the Horse Canyon mine for the Defense Plant Corp.; and the Columbia Steel Co. These mines are south and east of Utah Fuel's Sunnyside No. 1 mine and all are now operating in the Lower Sunnyside coal bed.

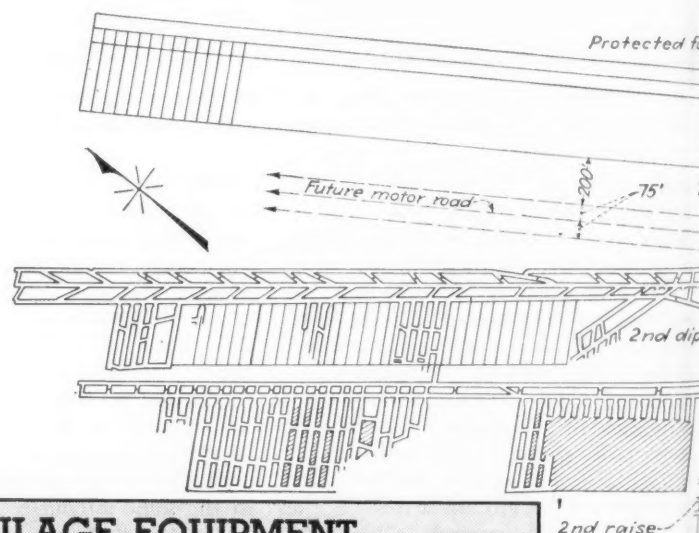
Geology. Throughout the Sunnyside

area there are two beds of coal, separated by a rock interval varying from a few inches to 40 ft. in thickness. The upper bed is 2 to 5 ft. thick and the lower Sunnyside bed 7 to 13 ft. thick. To the extreme north and south of Sunnyside the beds substantially merge. The lower bed is the larger and more persistent of the two, but is slightly

inferior in quality because of numerous bone and rock partings. The upper bed is of economically minable thickness locally, but such areas are restricted. Some attempts have been made to mine both within a given locality, but this has not been found economically feasible over large areas.

The coal beds occur in the Blackhawk formation of the Mesaverde group and are Upper Cretaceous in age. The Blackhawk formation consists of thick beds of sandstone with intervening beds of shale, sandy shale and coal. The original color of the rocks is gray to buff.

Coal beds occur in the middle portion of the coal-bearing member of the Blackhawk formation, which is 500 to 1,000 ft. thick. The sandstone is composed largely of semi-rounded



SUNNYSIDE No. 1 HAULAGE EQUIPMENT

MAIN HOIST (outside):

375-hp. 4,000-volt motor, 1 1/4-in. rope,
800 f.p.m., Denver Engineering
Works.

FIRST DIP HOIST:

200-hp. 2,200-volt motor, 1-in. rope, 400
f.p.m., Denver Engineering Works.

SECOND DIP HOIST:

200-hp. 440-volt motor, 1 1/8-in. rope,
600 f.p.m., Denver Engineering
Works.

MAIN HAULAGE LOCOMOTIVES:

1 15-ton Westinghouse.
1 15-ton Westinghouse-Whitcomb.
1 13-ton General Electric (standby).

SECONDARY GATHERING LOCOMOTIVES:

4 8-ton cable reel (Westinghouse).
2 5-ton cable reel (Baldwin).

MINE CARS:

150 6-ton all steel; spring bumpers;
hand brakes; Card Iron Works.

UTAH

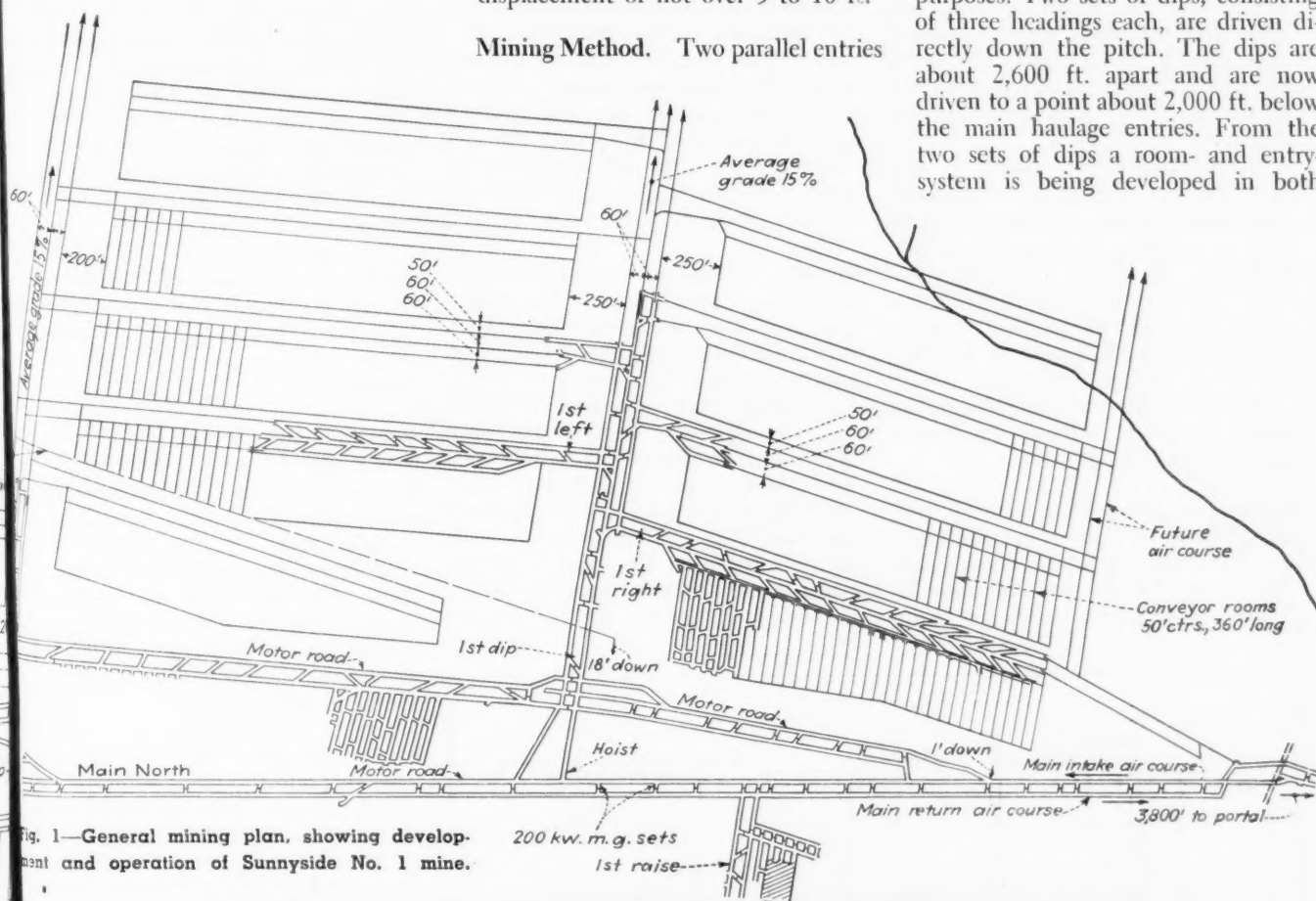
Utah Fuel's New Property, Embracing Mine, Preparation and Housing, Boosts Coal-Producing Facilities in the West

quartz grains cemented by carbonate of lime and reasonably well consolidated. The shale is more or less sandy and adjacent to the coal beds usually contains carbonaceous material. The coal beds usually are burned quite extensively near the surface. The for-

mation is adapted to forming massive cliffs. Some faulting occurs in the district, but it is confined to a definite zone and no displacement is over 30 ft. where the mine is operating. The faulting does not hinder mining materially as most of the faults have a displacement of not over 5 to 10 ft.

Mining Method. Two parallel entries

were driven from an abandoned section of the old No. 1 mine into virgin territory. These entries extend 8,600 ft. along the strike of the lower seam, from which two raises were driven up the pitch to the surface and are now being used for escape and ventilation purposes. Two sets of dips, consisting of three headings each, are driven directly down the pitch. The dips are about 2,600 ft. apart and are now driven to a point about 2,000 ft. below the main haulage entries. From the two sets of dips a room-and-entry-system is being developed in both



SUNNYSIDE No. 1 MINING EQUIPMENT

DRIVING ENTRIES:

- 1 Joy 11BU mobile loader.
- 1 Goodman 260 track-mounted loader (standby).
- 1 Goodman 360 track-mounted loader.
- 2 Sullivan 7AU track-mounted cutters.
- 1 Sullivan 7B shortwall cutter.

DRIVING DIPS:

- 1 Joy 8BU mobile loader (loading onto chain conveyors; one entry only driven downgrade).

- 2 Jeffrey 61-W chain conveyors.

- 2 Jeffrey 61-EW chain conveyors.

- 2 Goodman G20 shaker conveyors (used for driving two slope entry returns up the pitch).

- 4 Sullivan 7B shortwall cutting machines.

DRIVING ROOMS:

- 6 Goodman G20 shaker conveyors.

- 6 Sullivan 7B shortwall cutting machines.

directions along the strike of the coal seam. It is planned to drive the entries to their limits before room work begins. However, where the driving of rooms will not interfere with the overall plan of mining, and because of production demands, some rooms may be driven before the entries reach their limits. Additional details of the mining method are given on the accompanying mine map (Fig. 1).

Mining Conditions. It is the general nature of the Lower Sunnyside seam to have a bad roof. This fact has been known for many years, and with this in mind the necessary precautions always are taken to prevent accidents. Nearly all sections of the mine are heavily timbered. Top coal is left wherever possible, but timbering still is necessary even though the top coal is left. If the top once breaks, anywhere from 18 in. to 3 ft. of shale and slate may come down.

In the area where mining is now going on, the seam dips to the north-east about $8\frac{1}{2}$ deg., making it necessary to use rope haulage on all dip workings. The grades are fairly uniform, with only occasional adverse grades along the strike. Water always is encountered when going to the dips, but not in excessive quantities.

In the first dip the average height of coal is about 8 ft., while in the second dip it is about 12 ft.

Power Supply. All power is purchased from the Utah Power & Light Co. It is brought to the outside substation at 44,000 volts and there is stepped down by two 1,000-kva. trans-

formers to 4,000 volts for use in and about the mine. A primary 3-conductor No. 2/0 lead-covered cable carries the current underground, where it is further stepped down to 220 volts for use in the various mining units. Underground transformers for loading equipment and other movable units, such as pumps and blowers, are housed in transformer cars to permit keeping them as near the loading and cutting machines as practicable with a minimum amount of moving expense. The cars are designed and built at the mine.

D.c. power at 550 volts is supplied to the haulage locomotives by three motor-generator sets. One, a 150-kw. set with a synchronous motor, is located outside. The other two are 200-kw. sets with synchronous motors and are stationed inside the mine. D.c. power is used only for haulage locomotives. The other equipment uses a.c. The trolley wire is No. 4/0 figure 8 and is carried 6 ft. above the rail wherever possible. All equipment is protected by fuses and overload switches.

Blasting. Shooting is done on shift whenever a place is ready and under the supervision of a certified man. Hercules Red H.C. 60-percent sheathed powder is used. In room work, holes for blasting are drilled with Little Giant electric coal drills of the post type, while in entry work, where mobile and track-mounted loaders operate, Sullivan electric drills are mounted on the 7AU cutting machines and do the drilling at the same time the place is cut. Atlas blasting machines are used for firing the shots. Location

of the holes and quantity of powder used in each, for the various working places, is given in Fig. 2.

Ventilation. The fan is a centrifugal unit built at the mine from parts of other scrapped mine fans. It is exhausting 73,000 c.f.m. at a 2.75-in. water gage. At present the fan is operating at its maximum capacity. As the mine grows larger and more air is required a new fan with greater capacity will be installed at a location more central to the new mine workings. Ventilation at the face beyond the last crosscut is accomplished by Jeffrey Aerodyne Midget blowers and canvas tubing suspended on mine props. They will ventilate up to 400 ft. with very little difficulty.

Some overcasts are concrete but the majority have coke-breeze block walls with a concrete top. All permanent stoppings are built of coke-breeze blocks and are plastered on one side. Temporary stoppings are brattice and board. The stoppings blocks are 8x8x16 in.

Separate splits are maintained for each entry by means of overcasts and the air is measured on each split at least once a week. While the mine is considered gaseous, very little gas is encountered.

Rock-dusting. A good grade of rock dust is purchased in 100-lb. bags. It is distributed along the main haulage-ways and adjacent entries by an M.S.A. distributor. Where the duster is unable to go, the dust is distributed by hand. All sections of the mine are dusted. The use of rock dust greatly reduces the fire and explosion hazards, as well as increasing the workmen's ability to see.

Safety. Because of the hazardous roof condition and the number of inexperienced miners now employed, it is necessary to give extra attention to safety precautions. The company employs a safety inspector whose duty is to see that all safety rules are followed. He also supervises a systematic method of timbering.

In each level, and at convenient points along the main haulageway, first-aid material is available. This equipment consists of a stretcher, blankets, splints, finger bandages, compresses and other smaller items. The bandages, etc., are kept in a wooden cabinet which is painted white and marked "First Aid." The stretchers and blankets are kept in metal containers. The safety inspector frequently inspects all the equipment. Trolley wire, open gears and electrical equipment are provided with guards.

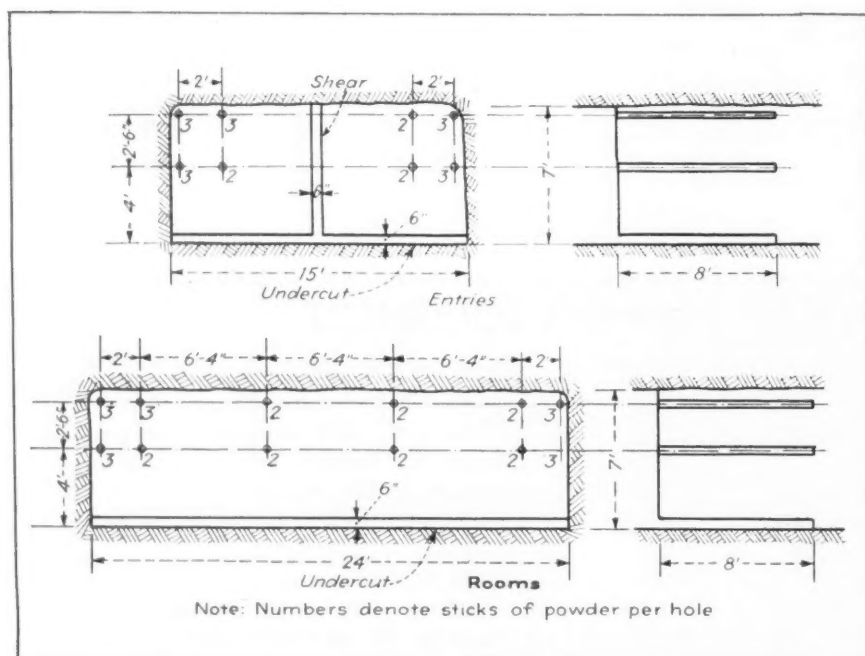


Fig. 2—Drilling and shooting plan employed at Sunnyside No. 1 mine.

Sunnyside Preparation

Preparing coal for coking, industrial and domestic purposes, the Sunnyside preparation plant employs washing, drying and thickening equipment

By **CARL S. WESTERBERG**
Preparation Engineer, Utah Fuel Co.
Salt Lake City, Utah

THE SUNNYSIDE preparation plant of the Utah Fuel Co. was designed to prepare uniformly low ash and sulphur coal in various sizes and combinations up to 8 in. at a rated input of 330 tons per hour. The coal is shipped to coke and industrial plants as well as to the retail trade.

Preliminary investigation revealed that the raw coal could be expected to contain an average of 7.65 percent ash and 1.28 percent sulphur. Extremes over a two-month sampling period showed a high of 13.7 percent

ash and 2.10 percent sulphur with lows of 6.2 and 1.02 percent respectively. A washability study of the coal from No. 1 mine indicated that it would be comparatively easy to wash, as most of the impurity was present as a shaly sandstone and slate broken free from the coal. There was only a small portion of the total impurity present as intermediate, or "near-gravity," material. About 35 percent of the total sulphur content of the raw coal was present as pyrites and was either largely broken free from the coal or concentrated in the heavy-gravity portions. Consequently substantial reduction in the sulphur content of the washed coal was anticipated.

After preliminary estimates of re-

quired material were made, priority assistance was requested. The Link-Belt Co. was awarded the contract for the design and construction of the plant and fabrication began on receipt of authorization from the WPB. Foundation work was started in July, 1942, and the plant was undergoing tests by November, 1943.

The plant is served by two Link-Belt rotary mine-car dumps which supply run-of-mine coal from the Utah Fuel Co. and the Kaiser Co., Inc., mines. From the dump hopper, holding approximately 80 tons, mine-run coal is fed to a Link-Belt 36x60-in. double-roll spring-relief crusher by a 54-in. reciprocating feeder with an adjustable throw. The crushed product is approximately 8x0-in. and is discharged to a 36-in. 6-ply belt on 266-ft. centers inclined at 10 deg. for delivery to the washery structure. The 42-in.-diameter head pulley also is a magnet for removal of tramp iron.

Delivery to a 6x44-ft. raw-coal screen

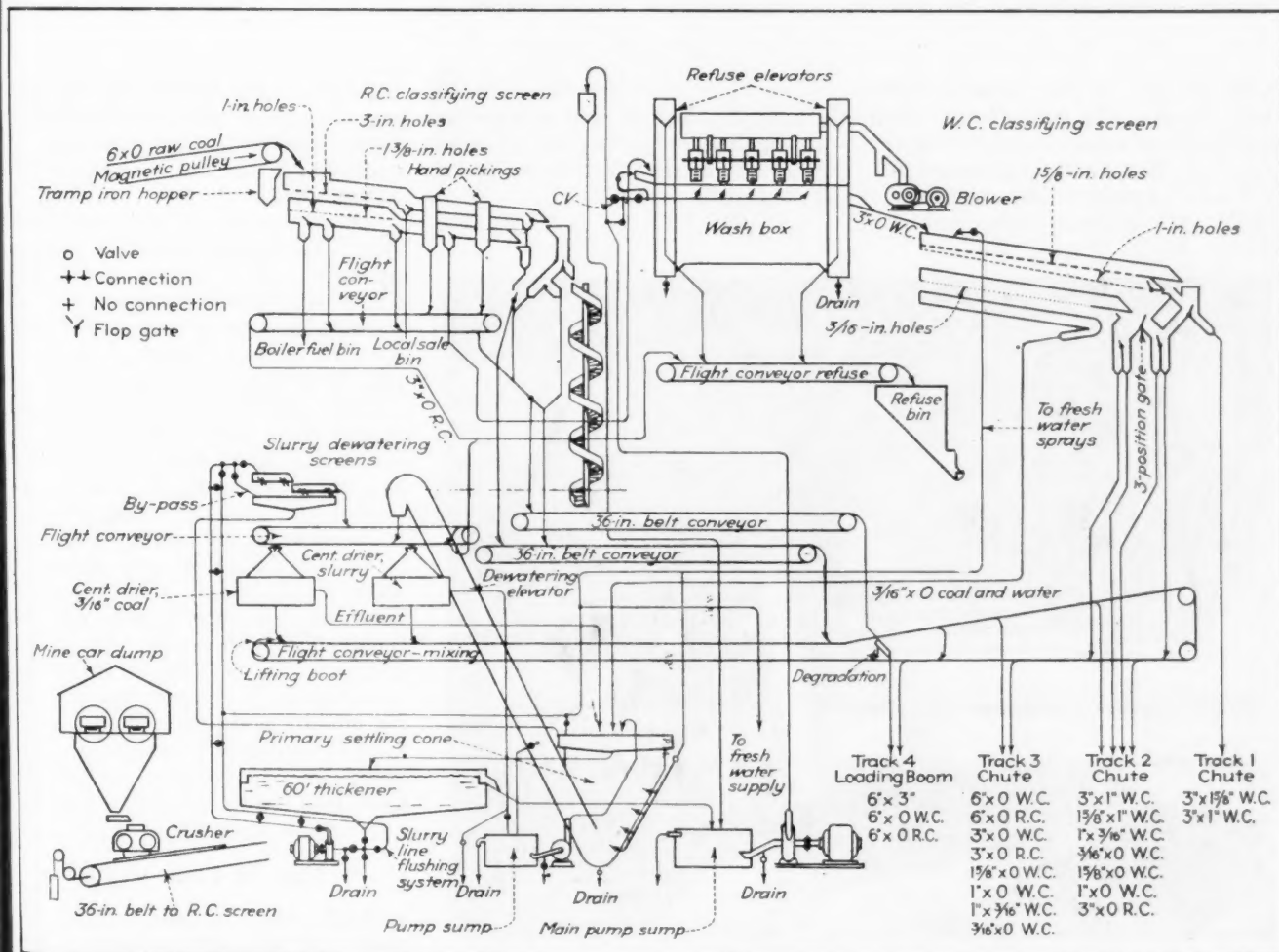
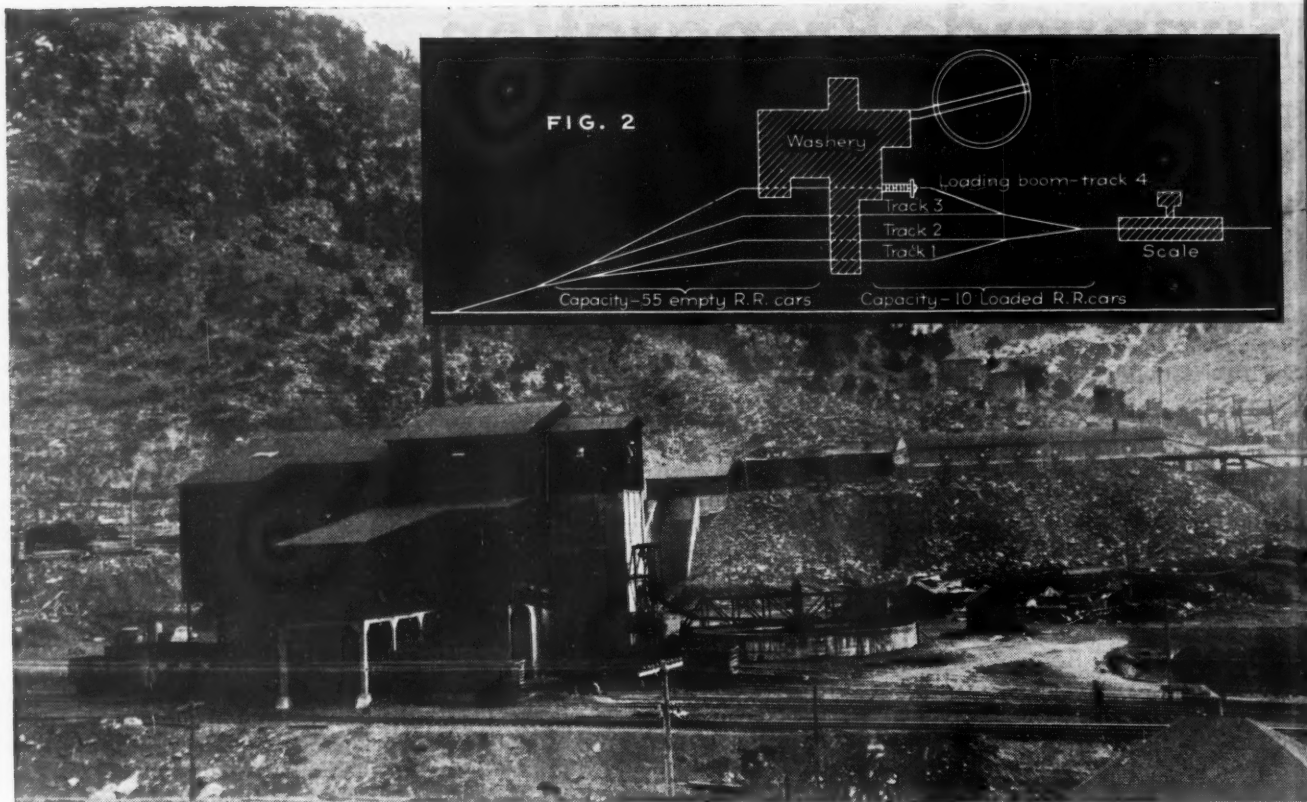


Fig. 1—Flow diagram for the Sunnyside preparation plant, producing coking, industrial and domestic coal.



The new Sunnyside preparation plant, with thickener at right and mine-car dumping facilities in the rear. Fig. 2—Arrangement of railroad tracks serving the Sunnyside preparation plant is shown by the diagram.

with 96 sq.ft. of 3-in.-diameter openings, the plus 3-in. coal is hand-picked on the lower unperforated half of the top deck. Space and facilities are provided for six pickers. The lower section of the raw-coal screen is provided with

1- and 1½-in. openings for supplying heating-plant fuel as well as a facility for bleeding out a portion of what would be wash-box feed to be loaded raw if desired.

The plus 3-in. size is chuted and

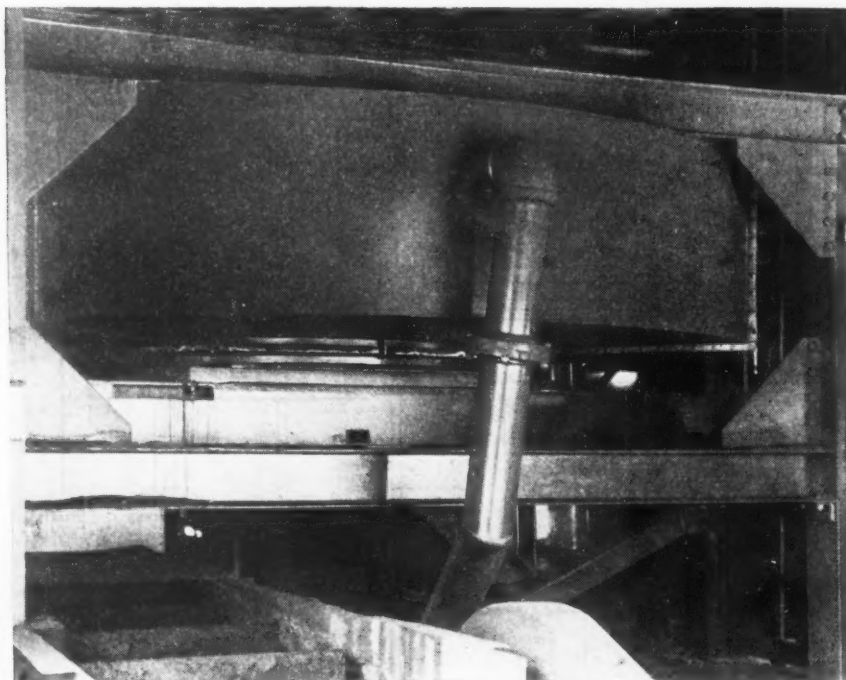
conveyed to the loading bay for loading as such or remixing with other sizes. The 3x0-in. raw coal may be washed or loaded raw at several points as indicated in the flowsheet (Fig. 1).

The washer is a Model 5044 Link-Belt 5-cell 2-compartment air-pulsated jig with a rated capacity of 250 tons of raw 3x0-in. coal input per hour. Air pressure is provided by a 16x36-in. Sutorbilt positive blower. After washing, the product is sluiced to a pair of 7x32-ft. flexible-hanger washed-coal screens and is there separated at 1½, 1 and ¾ in. The products above ¾ in. in size are drained on the screens and chuted to a 3x10-in. mixing conveyor or direct to the car-loading chutes.

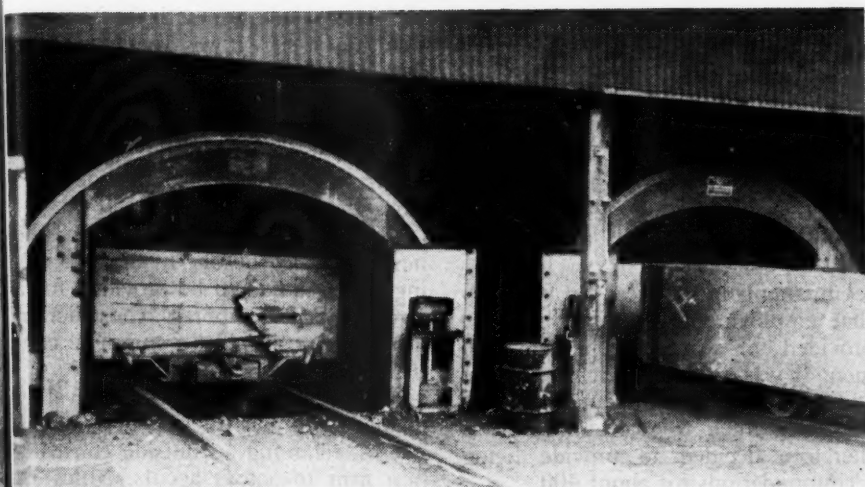
The ¾x0-in. coal and the wash water are sluiced to a 15-ft. primary cone classifier where a nominal separation at 28 mesh is made. The ¾-in.-x 28-mesh coal is collected from the cone bottom by a Luhrig-type dewatering elevator and delivered to a 48-in. C.M.I. continuous centrifugal dryer with ¾-in. punched-plate screens. The dried coal travels by mixing conveyor to the car-loading bay.

Loss of Coal Slight

Wash water containing minus 28-mesh coal from the primary cone is sluiced to a 60-ft.-diameter Wemco thickener equipped with an automatic



Continuous centrifugal dryer dries minus 28-mesh coal from 33 down to 12 percent moisture. A similar machine dries 3/16 in. x 28-mesh from about 25 to 7.5 percent.



Mine cars are handled by dual rotary dumps. Car capacity is 6 tons. Some cars have steel sides and some oak.

rake-raising device. The clarified water is recirculated by a 12x12-in. American Well Works centrifugal pump. The minus 28-mesh coal is thickened to a 50-percent-solid-bearing slurry and is pumped to two pairs of 4x5-ft. $\frac{1}{4}$ -mm. wedge-wire screens by a 4x3-in. A.W.W. centrifugal slurry pump.

From the wedge-wire screens the dewatered slurry is fed to a second 48-in. C.M.I. centrifugal adapted to slurry drying and fitted with $\frac{1}{4}$ -mm punched-plate screens. Since all slurry is recirculated there is no loss in fine coal other than from occasional surges of wash water into the overflow when the plant is started. Refuse from the picking tables and the wash-box are combined and conveyed to a 35-ton concrete bin for motor-truck disposal.

18 Employees on Staff

The plant is wired for 440-volt power and 220-volt lighting circuits. Power is purchased from the Utah Power & Light Co. The 35 motor and control units aggregating a connected load of 675 hp. are of Westinghouse manufacture. Starting circuits were installed with interlocking devices but are not presently operated that way.

The washery structure houses a 250-hp. B. & W. boiler fired by a Hoffman "Firite" spreader stoker. Boiler, setting and stoker were engineered, furnished and installed by Lee, Pace & Turpin, of Salt Lake City. The washery requires 3,200 sq.ft. of radiation at 75 lb. per square inch pressure supplied by eleven Trane unit heaters of various sizes. Fuel for the heating plant is belt dribble and raw slack coal.

Washroom, locker and toilet facilities are provided for men and women employees in totally inclosed rooms within the structure.

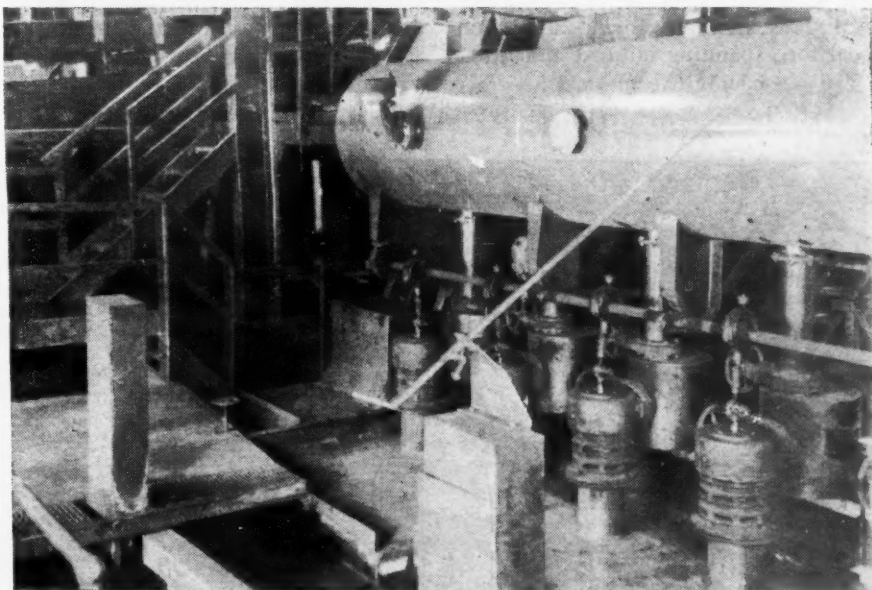
The present staff, operating on a

two-shift basis, totals 18 employees and includes the shift foreman, wash-box operator, car dumper, crusher man, slurry man, greaser, five women coal pickers, four car droppers, a weighman, refuse-truck operator and clean-up and boiler man. Experience has proved that women are very efficient at the picking

sampling, drying and grinding equipment at Sunnyside and a central control laboratory at Castlegate. Plant efficiency closely approximates that indicated by recent washability studies with a prepared product of nearly uniform 5.9 percent ash and 0.98 percent sulphur content. The wash-box refuse runs 96 percent sink material at 1.50 specific gravity and contains approximately 48 percent ash and 6.5 percent sulphur. Total refuse, including hand pickings, runs 58 percent ash and 5.5 percent sulphur.

The products from the two mines are presently dumped and loaded separately. Kaiser Co. coal, after preparation, is reassembled as 8x0-in. and shipped to the Kaiser steel plant at Fontana, Calif. Sized products from the Utah Fuel Co. mine are loaded as 3x8-in. stove, 3x1 $\frac{1}{2}$ -in. nut, 1 $\frac{1}{2}$ x1-in. pea and 1-in. slack.

Prior to the erection of this plant and the concurrent increase in tonnage in the mine, the Sunnyside coal was shipped only to industrial plants, railroads and coke ovens. Washed sizes above 1 in. are now finding wide acceptance in the domestic market. The slack sizes are distributed to industrial



A portion of the Sunnyside wash box with part of the raw-coal screen in the upper left background. Air pulsating apparatus in right foreground.

tables, thus greatly relieving the wartime manpower shortage.

Maintenance is handled by the machine-shop staff under Earl Warren, general master mechanic, and Roy Davis, master mechanic. Lamar Lindsay and Vincent Hyatt are plant foremen under James Thorpe, superintendent of Sunnyside operations, and Fritz Nyman, acting general supt.

Routine control work is organized on a bi-monthly sampling basis with

users as steam coal, while a proportion of either slack or upper sizes is shipped to the Utah Fuel Co. beehive-coke ovens at Sunnyside. Tests also have shown that Sunnyside prepared coal blended with freer burning coals mined in the Utah and Wyoming fields makes a premium domestic fuel. The preparation plant accordingly is designed to prepare coal for the commercial market as well as for industrial and coke-oven consumption.

Sunnyside Housing

Supplementing existing facilities, new Sunnydale addition provides 240 modern homes and community facilities for additional Sunnyside miners

By W. C. WALKER

Manager, Sunnyside Improvement Co.
Sunnyside, Utah

HOUSING facilities at Sunnyside were recognized early as inadequate for the expansion program contemplated. The mines were relatively isolated from existing population centers in the vicinity, and adequate homes for the greatly increased number of employees required for the expansion had to be provided. Sunnyside is 26 miles from Price, Utah, county seat of Carbon County.

Employment in Sunnyside No. 1 mine early in 1942 totaled about 60 men. To increase production sufficiently to meet the requirements of the Kaiser Co. steel plants at Fontana, Calif., as well as provide additional coal for expanding railroad and other

requirements in the area, it was known that employment would have to be provided for a total of perhaps 600 men. It was assumed that part of the additional men would somehow drive back and forth to work, and it was therefore decided to provide living accommodations for about 400.

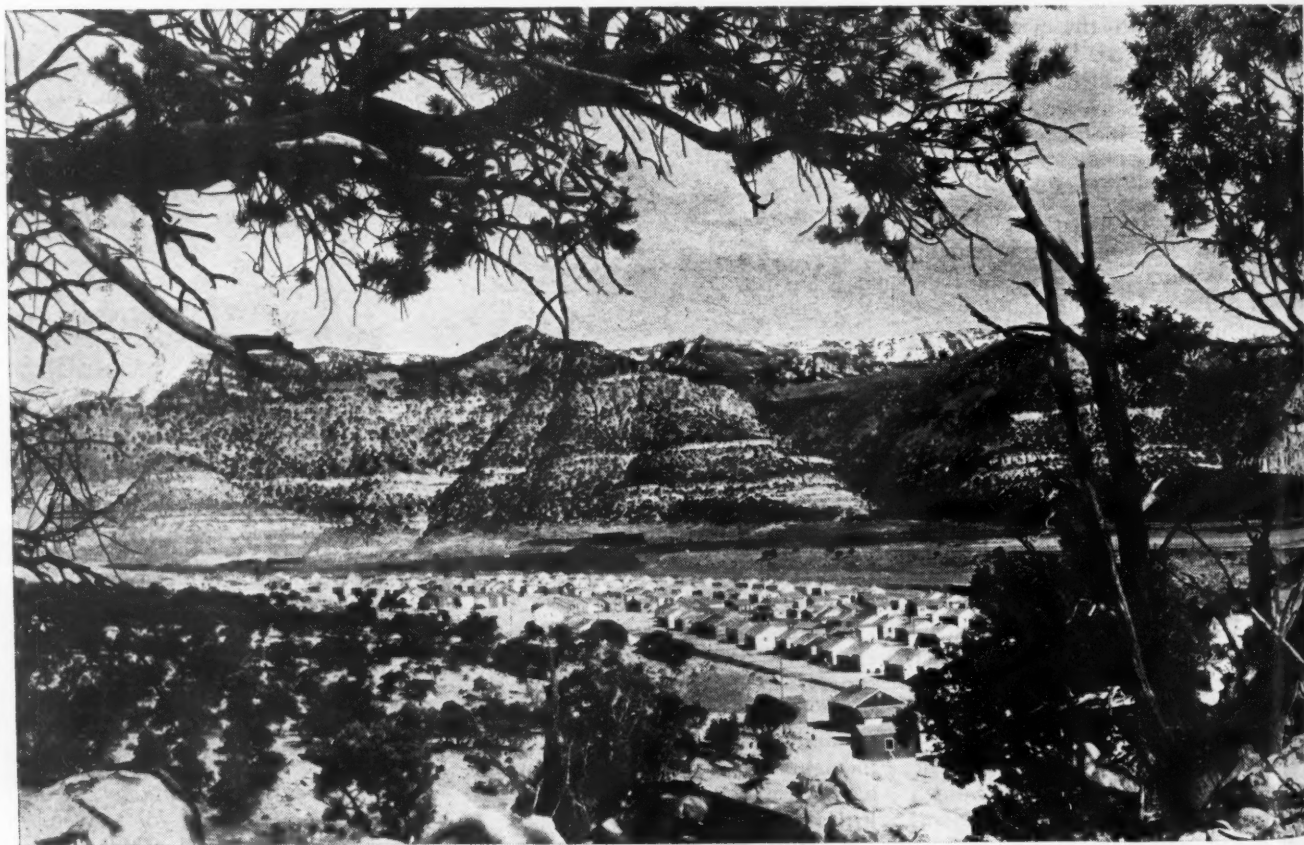
At that time about 40 older houses were occupied in Sunnyside and some 70 houses needed major repairs in order to make them habitable. The immediate construction of a boarding and rooming house for new employees also became necessary. This initial job of rehabilitation got under way in April, 1942. At about that time it also was decided to erect a number of portable two-room cabins and some tent dwellings. This was particularly essential to provide immediate housing for construction workers and also was undertaken in the spring of 1942.

After consultation with the National Housing Agency it was decided to erect 240 new homes in a separate subdivision within the Sunnyside town limits. The site, called Sunnydale, was selected just outside the mouth of Whitmore Canyon, about one mile from the center of the old town. By October, 1942, when work on the new dwellings began, living and eating facilities had to be provided for a force of 350 temporary construction workers. Accordingly, a complete construction camp was set up.

The Utah Fuel Co. privately financed the construction of the new houses, retaining an outside construction firm to act as agents. Miles E. Miller, Salt Lake City architect, planned and detailed the townsite and structures and the engineering firm of Caldwell & Richards was consulted on matters of drainage, water supply and sewage disposal.

Designs Are Varied

Seven basic house designs were used, all with four rooms, bath and utility room. Thirty-five of the houses have full-finished basements. Slight modification of design treatment gives the impression of individual planning for each house and thus eliminates the monotony of traditional mining town



Sunnydale subdivision, snapped during the final stages of construction.

ational erect subdi- town e, was th of mile n. By n the d eat- for a unction e con- ivately e new nstruc- les E. hitect, te and g firm nsulted supply

appearance. The first of the new houses was occupied in February of 1943. Individual building lots are not less than 55x100 ft. The houses average about 750 sq.ft. of floor space and those without finished basements are provided with garages. Foundations were formed and poured with coke breeze as aggregate after exhaustive tests to prove its suitability and strength. Compressive strength tests on the coke breeze-concrete mixture showed as high as 1,650 lb. per square inch. The concrete was vibrated electrically immediately after being poured into the forms. It was estimated that the use of this material saved a large sum of money, as it was available on the site from old stockpiles accumulated from beehive-coke operations.

The floors, walls and ceilings of the new homes are insulated and the interiors are plastered with a tinted textured finish coat. Floors are oak throughout. Sheeting and siding generally are pine, although some houses are covered with shakes. Roofs are cedar shingles. Bathrooms are fitted with lavatory, tub and toilet, with a hot-water tank for connecting to the tenant's coal range. The tenant also provides a coal-fired space heater, as well as a refrigeration unit. Rentals approximate \$30 each for 4-room houses and \$40 for 5-room houses.

Water Pumped 7 Miles

A water supply for the new townsite was obtained by renovating and reopening the Range Creek water-supply system. With this system the water is pumped from Range Creek, some seven miles away, over a high pass, into three storage reservoirs having a combined capacity of about 750,000 gal. The water is of excellent quality for culinary use.

In addition to the water system, a modern sewage-disposal system was constructed. The raw sewage is conducted through 8-in. tile to an Imhoff septic tank, the effluent from which flows into the dry land nearby. Electric power for the new townsite was obtained by connecting to the Utah Power & Light distribution system. A limited number of street lights were provided and also complete fire protection.

Since the new townsite was located about one mile away from the mine portals, shopping center and amusement hall, which were near the center of the old town, it was necessary to provide bus transportation from Sunnydale to Sunnyside. A new bus was purchased, therefore, and about eight round trips are made daily to accommodate the commuters.

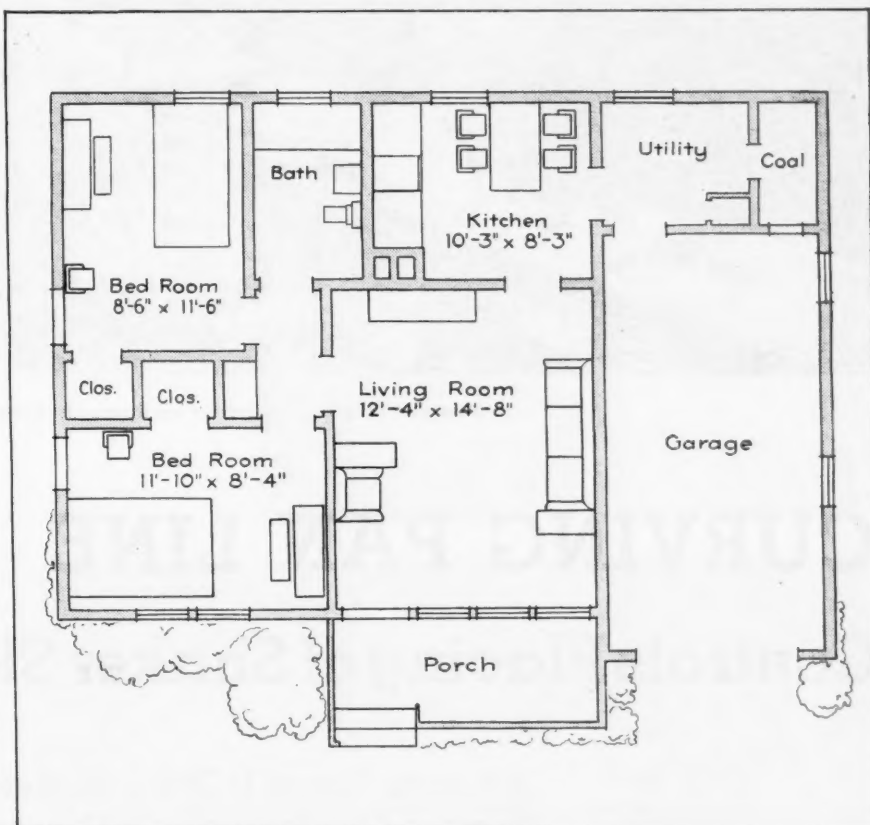
Other facilities that had to be pro-

vided include churches, moving-picture theater and game rooms for men, as well as a soda fountain and lunchroom. It is planned to provide lawns and playgrounds for the new townsite in the near future.

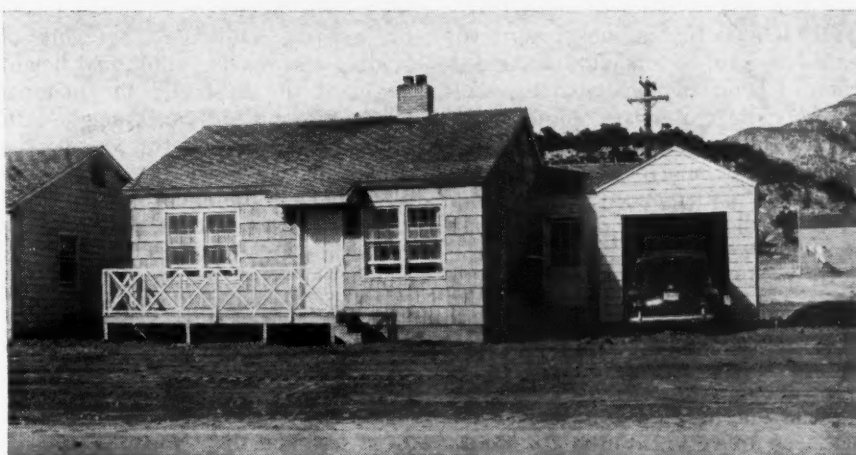
To properly operate the new Sunnydale subdivision, the Utah Fuel Co. formed a subsidiary company called the Sunnyside Improvement Co. The latter concern maintains an office within the new subdivision and thus is in constant touch with the residents and their requirements. Operation consists of rental supervision, maintenance, landscaping, water supply and numer-

ous other details connected with such a project.

The Sunnydale houses accommodate approximately 250 employees of the Utah Fuel Co. and the Kaiser Co., Inc. Older houses in Sunnyside, as well as the cabins and boarding houses, accommodate at least 150 additional employees. It is felt that these housing improvements were essential to the rebuilding of Sunnyside. Total employment at Sunnyside now approximates 550 men and coal production from the Utah Fuel and Kaiser mines is of the order of 3,500 tons per day, six days per week.



Various floor plans, of which this is an example, help provide variety in Sunnydale homes. Rentals approximate \$30 per unit of four rooms and \$40 for five rooms.



Modern design and pleasing appointments characterize this typical Sunnydale house.



Slate and rock are loaded by an automatic duckbill.

CURVING PAN LINE

Controls Placing of Shaker Slate Discharge

While the Theory Is That a Shaker-Conveyor Pan Line Must Be Straight, One Operation Is Curving Line to Control Placing of Slate Discharge—Second Handling Saved by This Departure

THE FACT that a shaker conveyor pan line can be operated around a curve is being demonstrated to excellent advantage at a large mine in the Pocahontas field where such a unit is handling slate and rock from the grading of an underground haulway. By changing the curvature of the pan line at its discharge at the drift portal the waste material is distributed to make a fan-shaped fill over a shallow and restricted space adjacent to the portal.

The occasion for the work is the construction of a locomotive haulway through one heading of an entry that had been driven to the crop. In it only the 36 in. of coal was taken, with a duckbill and shaker conveying inby to

the existing haulway. The work of grading and making additional height began at the drift and the material taken, top and bottom, averages 4 ft. total. At the time of this writing the work had progressed 620 ft. in from the portal and there remained an equal distance to complete the project.

Loading of the slate and rock is done with a Size 1½ automatic duckbill with a G-15 side drive. This discharges to a 24-in. belt conveyor, Type 9524, which was 400 ft. long when this article was prepared. At a point 200 ft. inby the portal it in turn discharges to a second G-15 side-drive shaker with its pan line curved at the portal. The duckbill, both shakers and the belt

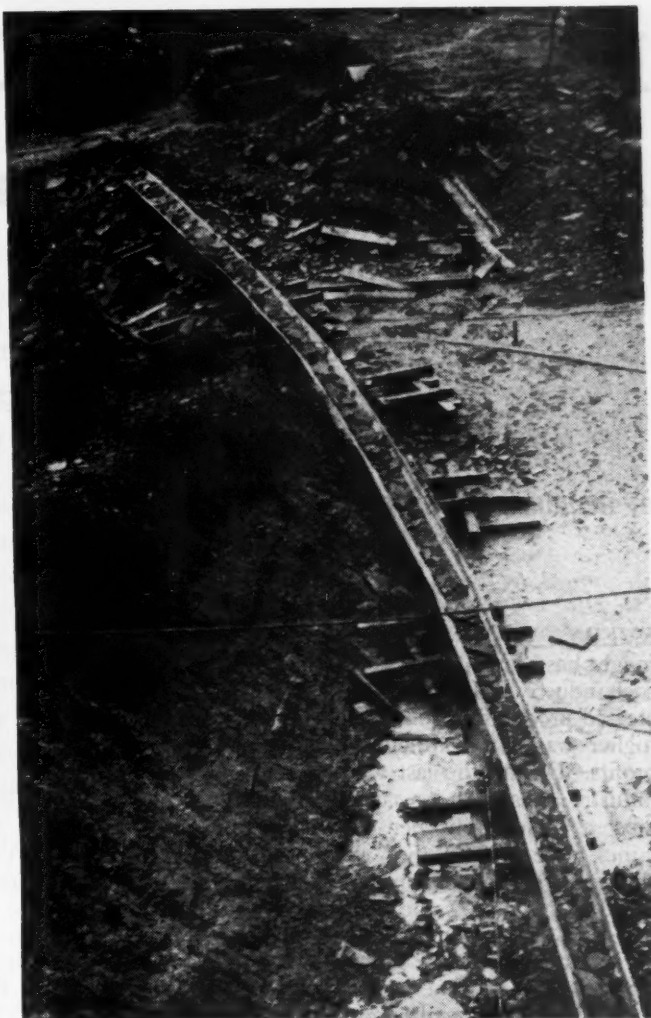
conveyor were supplied by Goodman.

The pan line is curved by inserting a thick washer between pan lugs along one side of the line. With an oversized nut about 1 in. thick used as the spacing washer, a deflection of approximately 4 deg. is secured per pan joint. At this mine the spacers have been used in ten or more successive joints of the 13-ft. pans, thus giving a total curvature of about 40 deg.

To make the curved discharge section of the pan line move in the path of an arc instead of in the normal straight line, there must be some flexing of pans, perhaps aided by play in the joints or cradle supporting blocks. A tendency for the cradles to oscillate



Not a photographic miracle—the pan line really operates on a curve as shown.



Another view of the curved pan line with the slate discharge at the far end.

sidewise on the blocks is discouraged by a guy line of wire rope attached at one end to the pan joint and at the other to a stake or tree some feet away.

How long the rope or radius needs to be appears unimportant and only two or three ropes are required to effect a turn of 30 to 40 deg. Only two were being used when the accompanying illustration was made showing the material being conveyed to the left. One rope was 4 ft. long and the other, on the pan joint next in the foreground, was 25 ft.

How Ropes Are Handled

Those lengths were determined by the presence of convenient anchorages at those distances. The shorter rope was attached to the sheave of a shortwall machine that happened to be parked near the drift. With that rope being rather short, a slight oscillating rotation of the sheave takes place, thus preventing short bending of the wire rope. The longer guy rope is anchored to a tree. Another long rope appearing in the same illustration anchors the shortwall machine against being dragged sidewise by the jerking action of the short rope.



This illustration, made at a later date than the others, shows the pan line curved in the opposite direction and construction of the portal wing walls under way. A wire rope guying a pan joint appears in the left foreground.

DEBT REDUCTION

A Guarantee of Future Working Capital

World War II Provides Coal With Its Big Opportunity for Attaining a Strong Future Financial Position—Liquidating Debts Now Assures Ample Working Capital for Postwar Coal-Mining Progress

By **ROBERT M. WEIDENHAMMER**
Washington, D. C.

EVERY WAR this country has fought has brought great activity to the coal industry. Hand-in-hand with increased production went higher prices, higher wages for miners and higher profits. During the last war, the coal industry expanded its capacity to almost a billion tons per year. Many mines were opened that were profitable enough while coal prices were up, but during the 20's the heartbreaking process of adjusting a billion-ton capacity downward to a half-billion demand had to be gone through.

Many of those coal companies that had gone into debt to finance their wartime expansion were the first ones to get into financial trouble, even though their managements often excelled on the operating and technical sides. By-and-large, only those companies that, in addition to top-notch technical management, had never veered away from sound financial principles survived the great depression of 1929-33 without scars, but even the 30's were, as a whole, but one long period of financial attrition for any but the lowest cost producers.

Coal Can Fortify Position

World War II has given the coal industry its great chance to put its house in order and thus face the postwar future in the strongest financial position it has ever attained in late years—a financial position that will mean maximum benefits to consumers in price and quality, to employees in earnings and to stockholders in dividends. There are many ways in which the managements of coal companies can strengthen their financial positions and thus secure these benefits to consumer, employee and stockholder. At least eight of such methods have been, or are being, considered by many companies at present:

1. Paying off bank loans.
2. Paying off bonds and mortgages.
3. Buying in preferred stock.
4. Adjusting capitalization.
5. Setting up realistic dividend policies on common stock.
6. Building up working capital.
7. Setting up postwar reserves.
8. Accumulating postwar refunds.

While World War II has materially increased the demand for coal, prices have not risen to any great extent, either compared to increases in World War I or to mining costs in the current war period. For this reason, as much as for the WPB policy of granting equipment priorities to keep existing mines going rather than equipping new mines for which no substantial need has been shown, there has been little permanent expansion of producing capacity. Coal, therefore, can look forward to a postwar future without fear of a major price collapse or the necessity of liquidating a large increase in capacity.

Coal-company financial managements, furthermore, have been bending over backward to prepare for a possible postwar stress and strain. Rather than go into debt for any but necessary expansion, in contrast to the policy of many organizations in World War I, every effort, it appears, is being made to pay off debts, accumulate working capital and otherwise prepare for maintenance of financial strength in a postwar recession—if such should occur.

Debt Liquidation

It is patriotic, as well as good business, to spend as much as possible on equipment to permit maximum output for present needs, provided, of course, that priorities can be obtained. But once funds have been allocated for this purpose, it appears important that profits be used to pay off debts

rather than to buy assets, such as coal lands or other going operations, for which no immediate need, such as replacing depleted or nearly depleted properties, can be foreseen.

The first debts to be paid off should be short-term ones, especially bank loans and bonds and mortgages due in less than five years. After this—and only then—one might pay off all other debts and build up to a strong working-capital position. Again, to buy as many war bonds as possible is patriotic as well as good business. Only after all debt has been liquidated and a strong balance of cash and/or government bonds has been accumulated does it seem justified to retire preferred stock or even common stock.

If arrears on an issue of preferred stock have to be paid off, it might be advantageous to offer stockholders an adjustment plan involving the exchange of such preferred stock for new common stock or income debentures. The latter method, while having definite advantages as far as savings on the corporate income tax are concerned, would, of course, represent, in a way, a step backward by creating a debt, however limited the rights of income-debenture holders might be.

Working Capital

The improvement in the financial position of the anthracite and bituminous branches of the coal industry is indicated by the following figures:

Five bituminous coal companies—working capital increased from 27.2 million dollars to 35.4 million between Dec. 31, 1939, and Dec. 31, 1943 (four years); debt reduced from 30.0 million to 5.2 million dollars in the same period.

Four anthracite companies—working capital increased from 20.4 to 42.3 millions between Dec. 31, 1939, and Dec. 31, 1943; debt, including adjustments proposed in reorganization plans, reduced from 133.1 to 77.2 millions in the same period. Eliminating reorganization proposals, the debt

reduction still is substantial—from 80.1 to 67.2 millions.

As much reason as the coal industry has to rejoice in such progress as this, one would lose the proper perspective if one should forget that earlier in the 30's many coal companies had come nearly to the end of the road. The difficulties of the anthracite industry, for example, are exemplified in the accompanying table. At the end of 1938 its working-capital deficit aggregated nearly 27 million dollars, and it took World War II to reverse a trend that otherwise might have made it extremely difficult for it to have continued to function—at least under the free enterprise system.

For a company—or an industry—that finds itself with its working capital impaired only one road remains open, provided there is still time to take it: curtailment of output and employment until sufficient working capital can be re-accumulated from undistributed earnings. However, the fact that decreased output usually results in higher unit costs of production and in further losses, rather than profits, all too often makes this road a dead-end street.

Because many companies continued to pay dividends in excess of net income, anthracite's working capital already had declined from 111 to 33 million dollars before the first unprofitable year of 1931. Would not the industry have been better able to meet the competition of other fuels by cost reduction, by more mechanical mining and more aggressive sales engineering, such as more active promotion of stokers to combat oil burners had it not lost its working capital between 1925 and 1937? Since the industry made a profit as late as 1931, it should have responded promptly to the general business recovery of 1933. Instead, granting that other factors also influenced the course of events, it seems logical that management, with inadequate working capital at its disposal, was severely handicapped in defending its share of the fuel market. The same course followed by a number of bituminous concerns led to much the same results.

Dividend Policies

All the methods of paying off debts, retiring preferred stock or building up working capital, previously discussed, necessarily have to be chosen at the expense of dividends on common stock. Common stockholders, of course, benefit by these actions at least as much as by receiving a dividend since they own the business and therefore, participate in any improvement in its financial position. But

Net Income and Working Capital Position of Companies for Approximately 90 Percent of Total Anthracite Output* (In Millions of Dollars)

Year	Net Income	Working Capital
1926.....	33.8	111.1
1927.....	13.8	99.8
1928.....	15.1	89.5
1929.....	15.2	69.9
1930.....	13.4	44.2
1931.....	8.6	33.0
1932.....	10.5(d)	22.7
1933.....	8.6(d)	16.5
1934.....	1.7(d)	16.3
1935.....	10.2(d)	8.9
1936.....	2.4(d)	4.6
1937.....	17.4(d)	10.8(d)
1938.....	14.8(d)	27.0(d)
1939.....	14.9(d)	15.7(d)
1940.....	0.5(d)	10.6(d)

* Report of the Anthracite Coal Industry Commission, Commonwealth of Pennsylvania, Harrisburg, 1938. The figures from 1935-1940 have been added by this writer from the sources used by the Commission.
(d) Deficit.

many stockholders, not without some justification, claim they should receive at least part of the profits earned in dividends and receive them right now. Nevertheless, it still appears that the interest of common stockholders is best served if earnings are first used to attain such an impregnable financial position that any conceivable postwar storm can be weathered safely.

Make Public a Partner

There is one argument, however, against undue conservatism in dividend policies. The coal industry, in my opinion, has suffered in the past from not having taken the public into partnership. No publicity can go as far toward establishing a real community of interest between coal-producing companies and a great number of American families as the purchase of stocks in coal companies by a wide circle of investors. No industry as basically important as coal has so few American families holding its stocks and thus becoming partners.

Naturally, just as regular dividends make for good will, years of stock ownership without dividends might make for unpopularity. As a rule, therefore, only companies with a very simple capital structure—preferably only common stock outstanding, and

with good prospects of being able to maintain continuous dividends—should attempt to secure a wide distribution of their equity securities. Once these conditions are fulfilled, however, it would appear to be in the interest not only of those specific companies but also of the coal industry as a whole if such companies were to split their stock and create as wide a market for it as possible. A stock selling at, say, 60 might be split ten for one and a dividend policy of some 50 percent of earnings maintained, provided that a strong working capital position already had been built up.

Postwar Reserves

A growing number of industrial companies are setting up postwar reserves, but only a few coal companies. As a matter of fact, setting up such reserves is a somewhat idle gesture, as the Bureau of Internal Revenue does not permit their deduction from taxable income. Likewise, the purpose of such reserves—strengthening company solvency—can be achieved just as well without reserves if the cash inflow from net income, depreciation and depletion is applied to debt reduction and increase of working capital rather than to dividend payments or investments in fixed assets. And as important as it is to realize the need for postwar reserves, such reserves, unless available in cash or government bonds, will be of little help in meeting a payroll if a company should find itself in a tight spot.

In considering financial position and postwar policies, also, management should not forget two factors making a high degree of liquidity desirable. Neither liability is visible in the cost sheet but both have grown hugely during the war. These invisible liabilities are: expenditures for new equipment that necessarily have had to be deferred and the necessity of replacing mines now nearing exhaustion. Operating men must help in keeping financial management conscious of these liabilities by presenting careful budgets of postwar cash needs for such purposes.

To sum up, next to the accumulation of working capital, debt retirement is the soundest principle of financial management today. Building up working capital, and thereafter retiring debt to the maximum possible degree, is the best possible guarantee of ability to produce efficiently while paying good wages and providing maximum employment, and at the same time making sure of a cost-and-cash position that will help coal to meet and beat the tough competition still in the ring.



Air-operated side-dump semi-trailer with 200-hp. tractor fitted with four dual driving wheels and 60-cu.yd. 45-ton trailer body.

TRUCK HAULAGE

Moves With Times in Serving Strip Pits

Truck Haulage Advantages Earn It a Place in Stripping — Gasoline Power Declining—Design Improvements Reduce Maintenance—Good Roads and Daily Inspection Insure Good Truck and Tire Mileages

By **FRED W. RICHART**
Assistant Editor, *Coal Age*

MANY EARLY rail hauls grew up around cheap equipment and poor construction. The track was lightweight and carelessly maintained. Steam locomotives had to contend with bad water and inadequate repair facilities. These factors, together with the huge section gang that shifted track in the pit by strong-arm methods and paid little attention to alignment and ballast, ran up delays in the pit and figures on the cost sheet that were discouraging, to say the least.

There may have been other rail-haul disadvantages playing a part in persuading a Kansas operator to place a trial order for 5-ton semi-trailers in 1927-28. The results were so en-

couraging that a new technique in strip-mine transportation was established.

Like many other innovations, rubber-tired haulage has had a run. It has caught the eye of every strip operator, large and small. It has caught up with trunk-line rail cars in truck capacity. Individual semi-trailers exist that haul as much coal as many of the narrow-gage rail trains in daily use. Rubber tires have even gone underground to solve problems that rail haulage thought belonged to it.

To say that the trend to truck haulage has carried too far may be overstating the case. Nevertheless, rails are staging a reshuffling. Perhaps a more accurate statement would be that rival methods of haulage are being coordinated. Trucks and rails are finding their legitimate places in the transportation picture. Cost per ton compels

consideration of both systems and the winner gets the job it can do best.

After 15 years truck maintenance costs are just now emerging into the open where they can be used to calculate transportation cost per ton. Perhaps the users of rail haulage are not so firmly convinced that good track is as essential for rail haul as good roads are for truck haul. Such unwise thinking is passing. In all mining problems guesswork and rule-of-thumb procedure are giving way to exact engineering and the results of experience.

Trucks have certain definite advantages over rail haulage. They are not confined to a groove. A stalled truck does not usually stop the traffic. There is no limitation of truck movement by passing tracks. When one truck of a fleet has a "flat," the percentage of capacity lost usually is small. It is regular practice at some mines to have

Industry Acclaims Coal-for-Victory Awards

» Two things stand out vividly in the industry-wide response to the "Coal for Victory" awards announced last month with the support and cooperation of the Solid Fuels Administration for War. They are:

1. The coal industry is determined to do everything in its power to produce the 691,000,000 tons needed in 1944 for all war and essential civilian needs.

2. The coal industry indorses the awards as both a fitting recognition of the industry's war contribution in the critical year of 1944 and an incentive for greater production efforts.

Sharply outlined in virtually every response to the award suggestions were the realization of the task before the industry in mining the record tonnage asked by the Solid Fuels Administration and a quiet but steadfast resolution that the production goals could and would be met. And coal greeted the plan to honor mines that increase their tonnage or efficiency by the required percentages with such phrases as "an excellent suggestion," "a fine idea," "long needed," "an inspiration." Soberly conscious also of the task ahead, many operators forecast that they would equal, and in some instances exceed, the 6½ percent jump in tonnage required to qualify for the production award and the 10 percent increase in output per manshift required for the efficiency award.

From every section of the country, from operators large and small, from bituminous and anthracite fields, came this immediate reaction to the award announcement: the coal industry's leaders are determined not only to win the award but to see to it that, come what may, they will supply the nation's war machine with its most essential material. For that work they ask no reward. But if other industries are being honored for no greater contribution, then coal's leaders

Why the Awards Are Offered

1 *As a stimulus to increase wartime production, anthracite and bituminous requirements for 1944 are placed by the Solid Fuels Administration for War at 691,000,000 tons, greatest tonnage ever asked of the industry.*

2 *As a fitting recognition for the work the coal industry has done and is doing to supply the nation with its most basic war material, a contribution hitherto taken for granted.*

3 *In suitable recognition of the exceptional and outstanding work done by the supervisory staffs of mines and collieries, without whose efforts coal could not have achieved its wartime record.*

4 *As a means of focusing public attention on the contribution to the war of the coal industry, thereby enhancing the industry's prestige, both in the mining regions and throughout the nation.*

5 *To encourage better and more efficient use of manpower and machinery, leading to better and cheaper coal now and in the future.*

COAL AGE AWARDS—STIMULUS

B. H. SCHULL, vice president, Pyramid Coal Co., Terre Haute, Ind.

"In my opinion the move is a good one and should contribute to increased production, as requested by the Solid Fuels Administration."

L. C. CAMPBELL, vice president, Koppers Coal Division, Pittsburgh, Pa.

"The Koppers Coal Division will be glad to submit its data for qualification in deciding winners of these awards. I believe you have a good idea and trust it may have the desired effect of producing coal needed for the war effort."

ROLAND C. LUTHER, vice president, Peerless Coal & Coke Co., Vivian, W. Va.

"I think that Coal Age's 'Coal for Victory' awards are a fine thing. We, like every other company, are most interested in winning one of these awards."

JAMES PRENDERGAST, president, Susquehanna Collieries Co., Cleveland, Ohio.

"I am entirely in sympathy with the aim of the plans you propose. . . . I believe the principle of an award for such effort is laudable and it has my sincere approval."

JOHN C. HADDOCK, president, Haddock Mining Co., Wilkes-Barre, Pa.

"The proposition seems to be a good one . . . it is well worth trying."

emphatically believe that coal also should have fitting recognition. The "Coal for Victory" awards, they declared, would fill the gap of lack of recognition which has existed since the start of the war and would provide a needed incentive to greater productive effort.

The list of those whose mines and collieries expect to try for the awards is already long and includes not only some of the nation's largest operators but numerous smaller ones. As one pointed out, everyone has an equal chance since mines are not competing against one another but against their own production records.

The awards, as explained in the announcement last month, will be made both for increased tonnage and for greater efficiency. The "War Production Efficiency Award" will go to mines which increase their output of fresh-mined coal per manshift by 10 percent or more in 1944 as compared with 1943, and the "Victory Production Award" will go to mines which increase their fresh-mined tonnage by 6½ percent or more in 1944 over 1943. All mines with a War Production Board serial number and which were in production in the calendar

years 1943 and 1944 are eligible to qualify. Similar awards will be made to all members of the supervisory staffs of winning mines or collieries.

Both awards are being offered with the support and cooperation of the Solid Fuels Administration for War, whose deputy administrator, Dr. Charles J. Potter, last month said:

"I feel sure that the Coal Age awards . . . will not only give valuable recognition to an industry making a valuable and vital contribution to the war, but will also provide an incentive to produce the added tonnage which the nation so badly needs this year."

Benefits which leading operators felt will flow out of the awards were numerous. Among them were:

An incentive to greater production.

A stimulus to better operating methods.

Better relations with supervisory workers, whose hitherto unsung work is being recognized by the awards.

Increased community and national prestige.

Recognition of coal's war contributions, achieved despite increasing difficulties.

S AND RECOGNITION

B. W. SNODGRASS, president, Moffat Coal Co., Denver, Colo.

"We believe it is a good plan and appreciate the effort on the part of Coal Age with respect to backing the war activities."

J. HOWARD MILLER, personnel manager, Jewell Ridge Coal Corp., Jewell Ridge, Va.

"To me your plan is well worth working for and highly commendable and a plan I believe will be appreciated both by the operators and the producers of coal; namely, by coal-mine workers. Our company would like to go on record at this time as being highly in favor of this plan."

JOHN T. SYDNOR, president, Rail & River Coal Co., Bellaire, Ohio

"It is my opinion that it is a very well thought out and excellent idea."

R. H. MORRIS, vice president, Gauley Mountain Coal Co., Ansted, W. Va.

"I think the coal industry has not had the proper recognition. . . . Your proposal . . . I think, is quite timely and worth while."

GOOD—

Working at an accelerated pace, bituminous mines had turned out approximately 321,000,000 tons in the first half of 1944. The anthracite record was approximately 33,350,000. Thus bituminous coal goes into the second half with a backlog of about 8,000,000 tons—the difference between half the requirements for the year, or 313,000,000 tons, and the actual output of 321,000,000. The anthracite backlog, on the basis of requirements of 65,000,000 tons for the year, is roughly 850,000 tons.

BUT

A backlog of 8,000,000 tons of bituminous is only four days of production, and 850,000 tons is just about four days for anthracite. At least four major holidays occur between July 1 and the end of the year—July 4, Labor Day, Thanksgiving and Christmas. In that light, the backlogs are not too substantial. Increased production and efficiency are more vital than ever.

THERE'S STILL A BIG JOB AHEAD

★ The preceding are only a few of the typical comments on the "Coal for Victory" awards received so far from Industry leaders. For these and others for which space was not available, the editors of Coal Age express their sincere appreciation.

Industry leaders emphasized that coal was supplying one of the nation's most vital war materials in ever-increasing quantity in the face of dwindling manpower, over-age workers, and hard-pressed machinery. Some said they had long been disappointed that coal had no awards similar to the Army-Navy "E" and believed that the "Coal for Victory" awards were an excellent alternative.

Coal mines have never received "E" awards, despite considerable pressure for them at various times, because coal is not regarded as a material directly expended in combat or training. In the words of one student of the industry: "You don't shoot coal at anyone, so it isn't considered a war material."

Interest in the awards prompted a number of questions on future plans and developments. The major questions and the answers, as far as now available, are given below.

Application blanks: under preparation for mailing in ample time to permit their being filled out and

returned by the end of January, 1945. The blanks will be short and simple.

Copies of the announcement and terms and conditions of the awards: available upon request to *Coal Age* in any reasonable quantity at no cost. Terms and conditions are repeated at the end of this announcement.

Judges: A panel will be selected within the next few weeks and will be announced in *Coal Age*.

Badges: Suitable badges for presentation to all employees of qualifying mines or collieries are being designed and will be made available at cost to any qualifying mines which desire them.

Additional information on these and other developments will be furnished to interested mines as rapidly and completely as possible through the columns of *Coal Age*. Future issues of *Coal Age* will make every possible effort to present as many helpful suggestions as possible on how mines and collieries may qualify for

the awards. Reprints of articles which have previously appeared and which industry leaders have stated to be helpful still are available. These include "Modern Coal Production," April, 1944 (50c. per single copy; lower prices in quantity); "How to Reduce Absenteeism," January, 1944; "Tested Methods," April, 1943.

Coal production during the first six months of this year set new records all along the line, and the goal of 691,000,000 tons set by SFAW is by no means impossible. But the hardest part still is ahead. There is no visible improvement in the manpower picture. The strength of older workers in the mines will be more severely taxed as the year wears on. That, plus summer days and the fall hunting season, will mean increased danger of absenteeism.

It will take all of coal's ingenuity and determination to meet the invasion year goal—6½ percent more than last year's record tonnage. It can be done. If the nation's war and essential civilian requirements are to be met, it must be done.

How Your Mine Can Win the "Coal-for-Victory" Awards

1. Any mine or colliery in the United States that has a War Production Board serial number and was open for production in the calendar years 1943 and 1944 is eligible to compete for the "War Production Efficiency Award" or the "Victory Production Award" or both.

2. The "War Production Efficiency Award" will be presented to any serialized mine or colliery otherwise qualifying that increases its fresh-mined output per manshift 10 percent or more in the calendar year 1944 as compared with the calendar year 1943. This award is intended to recognize outstanding achievement in promoting efficiency by the methods normally employed and judging shall be not alone on the results but also on how they were achieved. Mines filing for the "War Production Efficiency Award," therefore, shall supply a statement outlining how the increase in output per manshift was obtained and shall agree to supply, upon request, such additional information as may be required to permit a decision to be reached.

3. The "Victory Coal Production Award" will be presented to any serialized mine or colliery otherwise qualifying if its fresh-mined coal production in the calendar year 1944 exceeds its fresh-mined coal production in the calendar year 1943 by 6½ percent or more.

4. More than one mine or colliery operated by any one company is eligible for and may receive either or both awards if they otherwise qualify. The winning of an award, or awards, by one mine or colliery operated by a specific company shall not prevent another mine or colliery operated by the same company from also winning one or both awards if it otherwise qualifies.

5. The awards to mines or collieries will consist of certificates attesting their contribution to the war effort by exceeding 1943 calendar-year production or output

per manshift by the required percentages in 1944. Individual certificates also will be awarded each member of the winning mine's or colliery's supervisory staff attesting their contribution in helping the mine or colliery to win an award or awards. Should the operating company so decide, buttons for each employee at winning mines or collieries will be made available by COAL AGE at cost.

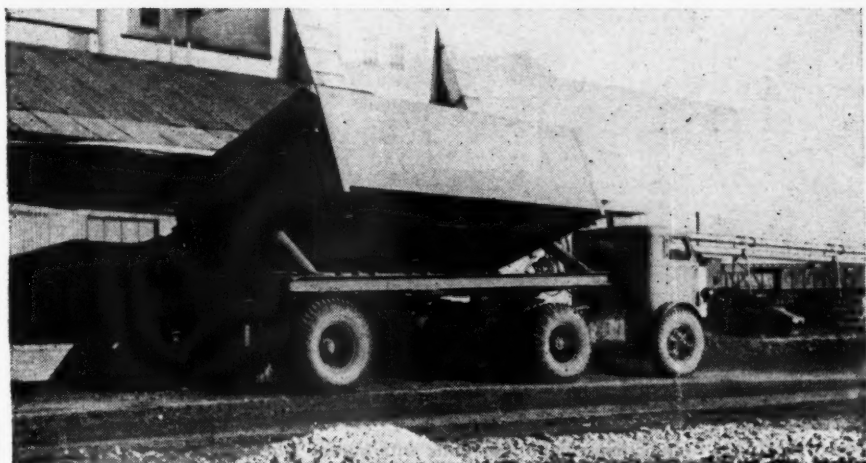
6. Qualifications for the awards shall be judged on the basis of statements submitted by authorized officials of the companies operating the mines or collieries in question on official forms to be supplied by COAL AGE. Statements must be completely filled out and must be filed on or before Jan. 31, 1945. Postmarks shall be the guide in judging acceptability under this restriction.

7. COAL AGE reserves the right to request from appropriate government or other statistical agencies certification of production and other figures submitted by coal companies filing for an award or awards, and such companies shall agree that statements are submitted subject to such certification.

8. A board of judges nominated by COAL AGE shall be the sole judges of the qualifications for awards and coal companies filing for the awards shall agree that their decision shall be final.

9. Realizing that changes arising out of the course of the war might materially alter conditions, COAL AGE reserves the right, if it should appear to be necessary, to modify the terms and conditions of the awards or adopt new terms and conditions, to the extent necessary to permit giving proper recognition for meritorious work in supporting the war effort.

10. Announcement of the awards will be made as soon as practicable after the final date for filing.



Hydraulic side-dump hinged-body 25-ton semi-trailer haulage unit, one of a fleet which replaced a rail-haulage system.

Coal Age

CONTRIBUTION TO LOWER MINING COSTS

an extra truck in the pit ready to take over. On the face of it, these advantages are difficult to offset.

Looking the country over, small- and medium-sized trucks have practically taken over the haulage of coal in small strip mines and are doing a very good job. Where a mining operation consists of separated small bodies of coal, trucks just don't have competition. The only questions to be determined are the right truck, body and equipment—and good roads.

Trucking from mines to preparation plant is not confined to strip mines. There are small shaft mines that have opened new workings a mile or two from the preparation plant and truck the new production to the existing plant. Now, also, a large shaft mine is being developed on much the same basis. There is no doubt that rubber-tired trucks are here to stay.

When it comes to large strip mines that accumulate acreage for 25 or 50 years of operation, where millions of dollars are invested in equipment and where a central preparation plant is built to process thousands of tons of coal a day, it is a different picture. Such an operation is an institution—a manufacturing plant. Its policies must reach years ahead when no fortune teller can forecast what mining equipment will look like or customers will call for.

The present-day trend is to use trucks for gathering service from loading shovel to transfer station. But the next dozen years may bring a score of changes important to strip mining. Already there is the fear that the tools and materials of war may upset the traditions of industry once peace arrives. But today the job is to make the most of what is available to produce the coal the country must have for victory.

Power plans for today's trucks are based on engines using three kinds of



Rear-dump 13-ton truck equipped with auxiliary four-rear-wheel drive and front body extension to protect cab and exposed equipment. The dumping arrangement is of the drive-through type in which an open floor is pushed down by the truck and is raised automatically when the truck has passed over to let the coal fall into the bin.

liquid fuel: gasoline, fuel oil and butane. Gasoline had a preference at the start. Automobiles had educated the public in its use and had established distribution facilities to meet all demands. But gasoline has two drawbacks; inflammability and the production of deadly carbon monoxide in the engine exhaust. However, gasoline has been convenient and easy to use.

Fuel oil, besides costing half as much as gasoline, has other favorable characteristics. Lubricating oil in the crankcase is not diluted. That also is true of butane. Both fuel oil and butane leave little carbon deposit in the cylinders and rings are left free of gum and carbon. Likewise maintenance is lower on engines using these fuels than gasoline engines.

Butane must have special transportation and storage facilities. It is so volatile that it must be kept under a pressure approximately 50 lb. per square inch to keep it in liquid form. Storage tanks are built for 125 lb. pressure and are fitted with safety

valves and high blow-off discharge pipes to carry the gas away from the ground and persons thereon. On escape to the atmosphere it vaporizes immediately. Posted signs read "No smoking within 50 ft." In some cases storage tanks are coated with aluminum paint to reflect the heat of the sun, keeping the temperature lower and the pressure down. Some users leave the pumping equipment out in the open to prevent the accumulation of explosive gas mixtures.

The exhaust from butane fuel is so free from carbon monoxide that truck engines are tested in the shop after overhaul without inconvenience to the workmen. The cost of butane is about in line with fuel oil.

The growing popularity of the diesel engine for stationary power and its low operating cost have attracted truck users. Now that satisfactory truck engines are available they are becoming very popular and are gradually replacing gasoline engines. The gasoline engine can be converted to butane

but not to fuel oil. Diesel pressures are much higher and require a better built engine.

A large oil refining company that has made many laboratory tests with various liquid fuels states that converted engines are not satisfactory. The correct thing to do is to buy an engine designed to use the fuel in question. This company furnishes fuel oils for several strip mines of the Midwest.

The actual situation in the coal-stripping industry is that gasoline power is going out of fashion for big trucks. A few mines use butane. The majority are switching to diesel. Lower fuel cost and lower maintenance cost make this change obvious. The comment of users is universally favorable. One other material advantage of the diesel is the absence of spark plugs, wires and other ignition gadgets. A leaky or missing hood or splashing pit water have no effect on engine operation.

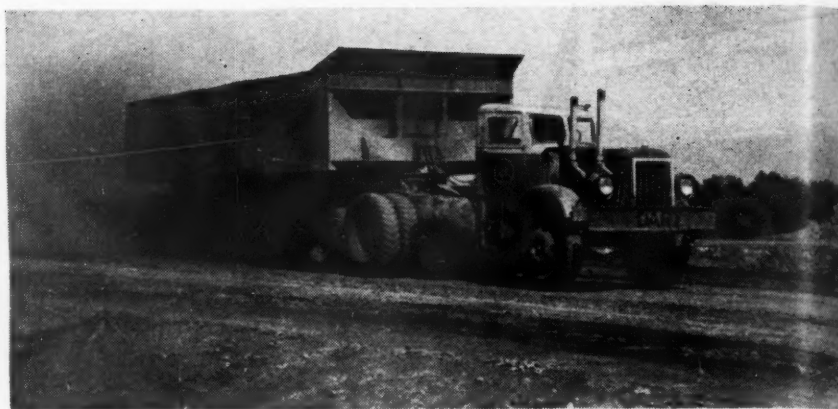
A means of increasing diesel engine power that is being used by some truck owners is the supercharger. Reduced to basic principles, it is merely an air compressor that puts more air into the engine cylinder and increases the pressure and power. It increases the horsepower by approximately one-third; or, for example, from a rated horsepower of 150 to 200.

Superchargers are not universally popular. Perhaps they are in better favor with operators than with maintenance men. Some of the latter think the added complication offsets the advantages. Some operators with experience highly favor them. There are situations where they are not only justified but necessary. Take the case of converting 15-ton trucks to 35-ton trailer trucks. Added power was required in a limited space. A case recently came to light where a diesel-electric locomotive fell down on its power rating because of the high mountain altitude where it is used. A supercharger might be the remedy.

Fluid Drive a Hit

An innovation in truck construction that promises a marked influence on maintenance is the hydraulic coupling, frequently called the "fluid drive." Scattered applications on one or two trucks of a fleet have not proved much, since most of the drivers are "agin 'em" because they lag in the travel cycle, failing to keep up with other trucks of the fleet. Operating supervisors are more or less non-committal. Most hydraulic couplings on strip-mine trucks are "on trial."

One truck manufacturer who has used "quite a large number" states that they have "worked out very satis-



One of six 70-ton drop-bottom semi-trailer units with butane tractors and four dual driving wheels. Bodies were fabricated from high-tensile steel by arc-welding. Another similar 80-ton unit makes a total of seven in the fleet.

factorily." A large user of these same trucks has at least one completely equipped fleet of very large trucks. An employee of this company credits the hydraulic coupling with two important advantages: ability to pull out of a tough road situation and a substantial reduction in truck maintenance.

The effect of the hydraulic clutch is to "overcome difficult starting, supply shockless drive and acceleration" and "protect motors from overload." They have had a wide application to various mechanical power devices.

One successful maintenance supervisor who objects to added complications admits that fluid drive is easy on the rear end and on the differential and will come into extended use after the war.

For dead-weight limitations with added strength, truck frames are made of high-tensile alloy steel. For the same reasons truck bodies are fabricated from the same class of material.

Three of the points of failure in heavy trucks have been springs, the driving axle and the rear trailer axle. Many of these failures have been attributed to poor roads, particularly since there is a marked reduction in such failures now that good roads are becoming general. But some failures have been cured by slight changes in design or by merely changing welding procedure.

There has been some experimenting with coil springs for carrying the load. One operator insists they are a decided advantage over elliptical springs, reducing spillage, repairs and lost time. The advantages will not be as marked as in the case of passenger cars. The first reason is that plain guides and straight-line vertical-body movement, unless of the round telescoping type, will be difficult to keep lubricated. Some badly worn guides have been noted. The second reason: trucks are

serviced every day and flat spring leaves can be kept oiled. The automobile equipped with flat springs finally rides like a log wagon because such springs are seldom oiled and literally rust together. There is a third reason that has nothing to do with design—good roads.

One make of truck of moderate capacity, 20 tons, and having two novel features in design, has chalked up some interesting records in connection with axle breakage. A fleet of ten trailer trucks in service for more than six years at one mine has not had an axle failure. There are no springs except for the steering axle. The single tires on both driving and rear trailer axles are 12x24-in. and carry low air pressures. The cushion effect of these balloon tires is a substitute for steel springs. The tractor driving axle is deep and strong.

The planetary gear reduction drive for this tractor is an unusual design with apparently a lot of merit. The maintenance shop where these trucks are serviced and repaired was thoroughly searched without finding a single spare axle or gear train.

Trucks with wheels that do not trail—that is, with an increasing track gage—help to keep roads ironed out flat. They avoid any tendency to make ruts and are advantageous in maintaining a good road surface, according to users.

Truck-body design, size, materials and dumping arrangement are dependent on capacity and permanence of the mine, length of haul, roads and other conditions. It is not in the province of this article to offer a solution to these many angles, but to point out trends and perhaps a few exceptions.

Broadly speaking, small mines use rear-dump trucks in capacities of 6 to 12 tons in preference to semi- and full trailers. Normally it is the application



A 35-ton drop-bottom semi-trailer installation dumping coal to a transfer station. The tractors are powered with 200-hp. supercharged diesel engines.

of a standard materials truck to coal hauling. They have the advantages of standard design and parts, moderate cost and easy turning in a narrow pit. They usually deliver coal from the loading shovel to the preparation plant and not infrequently use public highways for part of the haul. Moderate-sized standard trucks lend themselves very well to these conditions, and do a good job on hauls not too long. A recent innovation is the use of flat-bed trucks in conjunction with kick-back type dumps (March, 1944, *Coal Age*).

Small mine requirements usually do not merit any special study or design of truck chassis or body, since most small mines are single operations. There are, however, operators who specialize in running a series of small mines where the business carries on indefinitely but individual mines are continually being developed, worked out and abandoned. Such organizations do have occasion to make haulage studies and modify designs to better meet their needs.

The big strip mine offers quite a different problem in truck design and operation. It is in the realm of specialization. Its conditions are so different and its work so lasting that it pays to have tailored trucks or, more frequently, tailored tractor semi-trailer equipment.

The average semi-trailer runs 25 to 35 tons in capacity but the range is from approximately 15 to 80 tons. Most are equipped with mechanically or air-operated drop bottoms, since that arrangement meets the conditions of most transfer stations and preparation-plant raw-coal bins. Side-dump bodies are used to meet special bin conditions. When the body is hinged on one side it usually is dumped hydraulically after the fashion of rear-dump trucks. When dumping is by side doors they normally are air-operated. Drop-bottom trailer trucks have

one decided advantage over other forms of trucks in that the center of gravity can be made quite low. The added stability is much bragged about by some operators.

Straight trucks up to at least 40 tons capacity are in strip-pit service. One advantage over trailers is reduced space requirements for turning in the pit. Such trucks usually are dumped through air-operated doors in the sides of the body.

A user of whopper trucks is on record that the cost of truck fleets and the cost of operation both decrease with an increase of truck capacity. He believes that still larger equipment may be developed up to, say, 100 tons body capacity.

According to a sign chalked on the rear of a decrepit Model T coupe, "Beauty is only tin deep." Perhaps the average coal operator does not see any profit in running a beauty shop. But much of the satisfaction that is derived from a fleet of trucks is due to surface appearance, according to one of the unusual ones. "Cleanliness makes the men take pride in their jobs," said a certain Kansas coal operator. His trailer trucks are put on the rack and washed when they get dirty. They are cleaned up and repainted every two years even to the brand new shiny trademark. A truck just getting the finishing coat of paint was as sleek as a new machine just off the assembly line—not a dent in a fender.

Tires Are Money

Finally, we come to the crucial part of the rubber-tired truck—the tires. There we put our fingers on the point that still astounds many transportation engineers. They should study a tire data book. At that, strip operators can still learn about tires.

It was the cost of springs, axles and tires that convinced all strip operators that they would have to build and

maintain good roads. That resolution has sold a lot of road machinery, set up road maintenance crews and made money for the owners. Progress has been made but there is still room for added gains. One company added a lone hand-shovel man to its road crew who does nothing but fill chuck holes and dig rocks out of the road surface. That, with a little lower air pressure, has reduced tire cuts to a low point.

Every large strip mine has a sizable fortune tied up in rubber tires. A dozen trucks with ten tires each may represent a tire investment of \$30,000 or more. Only 10 percent less is six trucks with 18 tires per truck. Each truck may travel 25,000 miles a year and each tire may have a life of 15,000 to 50,000 miles, depending on its place on the truck and its treatment. Such variation in mileage offers a wide margin for profitable tire petting. The question is what to do about it.

The first question to be answered is the load and speed. Mine trucks average about 25 m.p.h. on the level and seldom do much over 30 m.p.h., so cotton cord tires are standard. Weight of load determines the size, number of plies, air pressure, type of tread and the number of wheels on the truck. Road surface and material also influence the type of tire tread and the air pressure. Tire manufacturers have tables from which a selection may be made and service engineers to advise on selection and operation. So much experience has been accumulated under such widely varying conditions that there is no reason to make any mistake.

Tire life is so important that some maintenance information is pertinent. When natural rubber runs out, truck owners will learn what tire trouble is. The very few things necessary to correct all rubber-tire ills are worth noting.

The cure for rapid tread wear is avoidance of overloads and correction of mechanical truck imperfections, such as misaligned wheels. All other types of strip-mine tire failures may be avoided by using the correct type and size of tire and carrying normal air pressure. Simple, isn't it? But it is right out of the tire manufacturer's "doctor books."

Overpressure causes cutting of tires rolling over a stony road. Numerous truck supervisors have reduced tire maintenance by bringing pressures down to normal. Overloading and underinflation are twin evils that have to be watched. For example, 20 percent underinflation or 20 percent overload cuts tire life 30 percent. The two combined, 50 percent. The motto is: save RUBBER tires. They are like "old wheat in the mill."

AGING LOCOMOTIVES

Need Revamping for Operation Today

By F. FRASER MacWILLIAMS

Johnstown, Pa.

PRESENT-DAY locomotives, properly maintained, should give nearly continuous service at minimum cost. However, there are many locomotives 20 years and older that must be kept in operation, and under some conditions it is almost a miracle that they continue to perform satisfactorily. One trouble is that on many haulageways the track is too light. A 40- or 50-lb. rail for a 10-ton locomotive is all too common. Sand used constantly and excessively results in rapid wearing of wheels and other parts, particularly where gear cases have been removed or worn through by dirty track. Brakes should be kept equalized. Broken motor suspension springs cause much trouble and consequently should be closely watched. Axle liners must be renewed when necessary if gears are to mesh properly. The vast difference in the life of these parts at various mines indicates a lack of proper lubrication in many cases.

Wheels should be changed when the false flange reaches $\frac{1}{4}$ in. and retreaded to standard shape and gage. Pairs should be turned within $\frac{3}{8}$ in. of the same diameter and $\frac{1}{4}$ in. between sets. Using tires or wheels with flanges less than $\frac{3}{8}$ in. or a tread thickness less than 1 in. will cause trouble. Turning on the axle is preferable to removing the tires and turning, since a wheel turned on its axle is bound to be true and a slightly bent axle will be noticed at once.

The writer has often wondered what improvement in coil repairs would be made by considering a burned-out armature as a fatal accident and similarly determining its cause. Unfortunately, a really satisfactory protective device for mine locomotives has not been developed. Such a device would have to be applied to the individual motor, since any line contactor must be set for the total full-load current of both motors in parallel. For hours each day many motormen are starting and running in parallel on resistance when they could be operating in series with little or no resistance. Most of the older locomotives in fact are too fast for efficient gathering.

Field coils should be properly tested

each time an armature burns out rather than after the replacement also has burned out. Many locomotives are being used on grades of 8 percent or more where the weight of the locomotive is a big part of the load and where a hoist should be considered. Some operators seem to determine the proper size trip by a cut-and-try arrangement. If the motor can haul 40 cars they try 45, and so on, until an armature burns out. In many cases more coal could be hauled with shorter and more frequent trips, then overload would not delay trips or damage equipment.

To Lengthen Life

Routine repairs can increase the durability of old locomotives. Wiring, when replaced, should be large enough for the job. Conductor capacity in accordance with the Underwriters' Code, based on 66 percent of the motor rating, is about right. Wiring can be protected by channels or troughs along the frame or inclosed in cotton fire hose. The new continuous-strip-type resistance should be considered when a resistor replacement is necessary. New type fingers and segments with renewable tips are available for many old controllers. Snap-type headlight switches can be replaced by the knife-blade type with ample capacity.

Old wooden bumpers can be replaced by newer steel bumpers to give rigidity to the locomotive frame. A large channel securely fastened to the side frames with heavy angle reinforcements and wood blocks for shock absorption makes a cheap but sturdy bumper. Many old chain-type brakes can be redesigned. One type, with a long clevis threaded onto a screw, can be changed to a plain clevis with a renewable nut. Care should be exercised that changes do not destroy the proper weight distribution per axle or increase the total weight of the locomotive, as many old locomotives had too little horsepower per ton to begin with. Housings and cases can be welded and remachined to standard, sleeve-type bearings being replaced by ball bearings in the process.

The grease seal on armature housings too often is neglected, so that the commutator becomes oil-soaked and the bearings full of dirt. Fireproof armature insulation would be more ef-

fective if so many operators did not think its use enabled them to forget about overloads or low voltage.

While the general design of most locomotives is satisfactory, many features could be and have been improved. With outside frames there is no excuse for taking the end thrust on the hub of the wheel when a bronze adjustable thrust washer bolted to the journal-box cover and acting on the end of the axle is so convenient. For outside wheels, the journal brass with integral thrust collar seems far superior to other devices used. Most frames are protected by wearing plates at points of contact with the journal box but replaceable wearing plates could readily be installed on the box itself. Many old journal brasses were not properly held in place, since the top key quickly rocked out.

Many axle liners as originally made have an oil slot that is much too large. An oil slot $1\frac{1}{2}$ in. wide should provide effective oiling and much better support. Many cases can have the axle caps made into one piece by welding in steel tubing and drilling and tapping the center of the case for extra support to both. This eliminates the continual breakage of axle cap bolts, and the long one-piece axle liners with oil reservoirs and grease retainers last many years.

Split gears have always been a source of trouble, while solid gears with gear cases should last for years. Many locking devices for pinion-end bearing nuts are so difficult to install that they are not used. The type locked by the pinion key, however, is very successful, particularly in the new labyrinth grease-seal type. Shrink nuts, of course, hold tight on the shaft but may not always be tight against the bearing race. Bearing housing covers held in by bolts require fewer repairs than the threaded type, which can be changed by welding on lugs.

Practically all of the foregoing suggestions are from the standpoint of the smaller operator with limited repair and maintenance facilities. They could be, and are, vastly changed and improved in the large mines. In all mines, both large and small, however, the key to effective haulage is good design, maintenance and repair. The greatest of these is maintenance.

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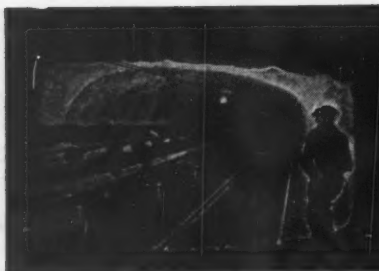
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THE FOREMEN'S FORUM

Have You Studied Every Job Closely?

To Forestall Accidents, Safety Men Should Analyze for Hazard in Detail All Jobs Under Their Charge—This Incidentally Also Will Increase Efficiency

By P. L. G. HASSKARL
Safety Engineer
Pennsylvania Power & Light Co.
Allentown, Pa.

SAFETY IN INDUSTRY is dependent for its success on: (1) the fitting of workmen to the job and (2) protecting the workmen against the dangers of his physical environment. Regarding the first, four questions may be asked: (1) How well are the workers fitted for the job? (2) How skilled are the workers? (3) What is their temperament or attitude? and (4) How should the rules and practices be supervised or enforced?

Training and skill are both listed in this category. They may seem to be identical, but while men may so follow the method taught as to exhibit good training, they do not prove their skill until conditions compel them to improvise.

To assure a safe physical environment the following questions should be studied: (1) What are the conditions surrounding the work area? (2) What are the hazards arising from other sources? (3) How adequate is the lighting? (4) How safe are the machines and tools? (5) How effective are the guards and safety devices? and (6) What is the safest method of performing the work?

Men often avoid direct hazards but fail

Digest of address, entitled "Some Basic Facts in Accident Prevention," delivered at the first annual banquet, Anthracite Safety Engineers' Association, Hazleton, Pa., April 20.

to note endangering conditions that are outside the work area. When lightning, floods, sleet and windstorms have torn down a pole line, our electrical repairmen know they are facing hazards, and that unless they size up the situation correctly they will be injured. So they use circumspection and come through without accident, but, at other times, in routine operation, they act on impulse and see, but, with disastrous results, do not observe. They pick up a wire using for their protection rubber gloves that are well suited for ordinary work but are inadequate if a high-voltage cable has fallen on, and charged, the wire unduly.

Most important of all factors in safety is the method of doing the job. As we all know, there is a right way to do it or any part of it, and the right way is the safe way. Finding that way is denominated by the War Manpower Commission as "job planning." This idea is not new. The first step is to break down in detail the present way in which the work is done from start to finish in the order in which it is now being done. The job should be pulled apart and each detail analyzed by applying the six questions why? what? where? when? who? and how? and then—as a second step, the job should be reassembled in proper sequence with all safety features included in so doing. The simplest and surest way should be chosen. By eliminating or combining motions not only is time saved but accidents are made less likely.

Only the right way should be shown. When both ways are presented, the wrong

and the right are both equally engraven on the memory, and the wrong way may be chosen. After one such demonstration, two men argued as to which was the correct technique. One insisted that the wrong way was the correct method and, following that wrong indication, lost his life.

Breaking down a job into sections or reassembling a machine often shows how to make the procedure not only safer but easier also. A safety engineer may argue he has no time to do this, but accidents take even more time for investigation and report. Such time better might be spent in investigating the job and thus avoiding the accident. Many foremen who resent studying a job solely for safety will break down a job for economy of time, material and effort and become enthusiastic at the same time to note how well the newly evolved method fits into the safety campaign.

It is the daily round, the everyday job, that paralyzes and destroys a man's thinking faculties and so lays him open to accidents. Everybody knows he should watch his step, but how few do so. That is why signs "Watch your step" are seen everywhere. Safety men speak of the normal state of the human being as his "habit level." Only by raising him above that level and keeping him there can safety be assured. If a way were found of lifting workers above their habit level, accidents would be reduced 75 percent.

Watching the Mine's True Life Line

Repairs to cutting and loading equipment, locomotives, shuttle cars and mine cars are important, and, to this end, for the most part, spare parts usually are provided and the mechanisms are meticulously inspected and repaired after they have handled a certain number of tons of coal. The larger and better organized companies have extra units and make a practice of bringing out of the mine one unit of the first four items at intervals for a complete

ELEVEN WAYS OF THWARTING ACCIDENT

Better Workmen

- (1) Specific Training
- (2) Acquired Skill
- (3) Steadier Temperaments
- (4) Improved Attitudes
- (5) Closer Supervision

Better Conditions

- (1) Safer Surroundings
- (2) Control of Remoter Hazards
- (3) More Adequate Lighting
- (4) Safer Machines and Tools
- (5) Effective Guards
- (6) Job Planning

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BALL BEARINGS HAVE PUT THEM ASHORE



WHEN we made the assault on Hitler's Fortress Europe an overwhelming armada of invasion boats, fighting ships and planes did that job. Imagine if you can the millions and millions of ball bearings that were functioning in that greatest concentration of mechanical might of all time.

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refurbishment, whether it needs such service or not.

But a failure of any one of the five, though it upsets the regular flow of coal, does not close down the mine as effectively as does breakage of the hoisting engine and its ropes, the main conveyor line and its chains or the main units of preparation equipment, for these are located squarely across the very life line of the mine. The others are units that affect only a district and not the entire operation.

Fortunately, such ropes and chains as have been exposed to stress and wear to the point of fatigue usually can be used elsewhere where the stress is less and where failure is not so vital, and their retirement to such points should not be too long delayed, especially when suspension of production hinders the prosecution of the war or merely makes it difficult to meet market demand.

Ropes, and especially chains, have a varying life span. Of two chains installed in turn on the same scraper line, one may last two or three times as long as the other. As soon as the chain begins to stretch or wear it gets out of pitch, and then deterioration is rapid. If the chain breaks, the damage done may take a week to repair and even replacement will take about two shifts. It is well to make the change when a shutdown is dictated by lack of market and not by a need for replacement of parts.

Similarly, cleaning equipment should do its work without becoming clogged with excessive refuse. Where the quantity of refuse to be removed is excessive, as often is the case with a culmbank, with the stripping of first-mined coal or with the use of a dragline, it is well to have a scalping plant near the point of extraction, for this will enable the main cleaning units to work so steadily and efficiently that deep-mine operations, the product of which is cleaned with the stripped coal, will not be hindered.

The main pump, the main fan and the main preparation units and tracks below the tippie or breaker are the life lines of the coal operation and need constantly to be watched. The preparation or the surface foreman can ruin the mine foreman's record by irregular operation and the mine foreman can interfere seriously with the volume and excellence of the preparation product if he fails to keep coal coming steadily and representatively to the cleaning equipment.

What a Mine Fan Is And Is Not

A mine fan is not equipment to drive air through a mine. It is a means merely to raise the pressure or to lower it at some point in that mine. The air itself,

its equilibrium thus destroyed, causes a movement of the air toward the spot if the pressure is lowered or from the spot if the pressure is raised. In all calculations of mine-fan performance, note that pressure and resistance determine velocity and volume of air, just as head and pipe friction determine movement of water in a pipe. The mine it is that determines what air can pass through it and its many passages with any given pressure. Fan efficiency is not efficiency in passing air through a mine but in raising or lowering pressure for a given expenditure of power. Thus, for mine air, demand of the mine less resistance or of the fan manufacturer more water gage—yes, and of the stoppings less leakage.

Fan or Mine Failure

Many members of the mining profession misapprehend the separate functions of fan and of mine passages much as the general public fails to understand the relation between a defective heart and a failure of blood circulation. Either heart or arteries may be in excellent condition and yet the body may suffer from insufficient blood supply. Hardening of the arteries (arteriosclerosis) and the presence of blood clots (phlebitis) may be as disastrous as a weak or leaky heart.

Many a mine has a good heart but inadequate or defective arteries.

Power Need for Fan Cut by More Headings

Two Intakes Are Four or Eight Times as Good as One or Even More, for Leakage Will Be Almost Eliminated or Be Reduced by Lower Pressures

MOST PEOPLE regard two intakes as twice as good as one. If direct or one-way ventilation is used, however, the two intakes made as result of taking over the return airway and using it as an intake makes the two intakes eight times as good as one. As there is no return, there can be no escape of air from intakes to return or vice versa. However, some air may come in from, or leave to, other entries, to other mines or to the outcrop.

When the entry has two intakes and two returns instead of one intake and one return, and the system of ventilation is looped back almost to the portal, then two intakes are only four times as good as one but may be more because lessened pressure cuts down air leakage considerably.

That one-way ventilation is at least eight times as good as looped, or circulatory, ventilation may be shown as follows: The power on the air = the pressure imposed on it by the fan or natural ventilation or both (p) multiplied by the velocity of the air (v) and again multiplied by the area (a) or in the algebraic language pva . As the pressure =

$$\frac{k s v^2}{a}; pva \text{ will equal } \frac{k s v^2 \times va}{a} = k s v^3.$$

In the case of one-way ventilation replacing the intake and return system in a mine by the construction of a shaft, slope or drift to the surface or of several, pva has become $p \times \frac{v}{2} \times 2a$, for the velocity will

be halved and area will be twice as large as before, but that, as will be seen, still will be represented by pva as before, for the 2's cancel. The rubbing surface s will be the same as before but the velocity will be halved, so v^3 will be $(\frac{1}{2}v)^3$ and

$$pva = ks (\frac{1}{2}v)^3 = ks \times \frac{1}{8} v^3 = \frac{1}{8} k s v^3$$

Thus only one-eighth of the power will be required with this arrangement.

Bills Shaved 75 Percent

However, in figuring on the advantage of providing two intakes instead of one but still returning the air back to a point near the entering portal, you are doubling the rubbing surface and in this instance

$$pva = k \times 2s \times \frac{1}{8} v^3 = \frac{1}{4} k s v^3.$$

This with two intakes, a fourth as much power will be required as is needed with one intake. With three intakes power will

$$= k \times 3s \times \left(\frac{1}{3}v\right)^3 = k \times 3s \times \frac{1}{27} v^3 \\ = \frac{1}{9} k s v^3$$

and with four headings it will

$$= k \times 4s \times \frac{1}{64} v^3 = \frac{1}{16} k s v^3$$

It is clear that we have in this case not the rule of the inverse cube but of the inverse square. The advantage of one-way ventilation and of multiple headings is well substantiated by these figures.

Of course, you can't start, though you may plan, a mine on a one-way ventilation system, and its development always will involve loop, or circulatory, ventilation. You get the advantages only in those entries in which return, or loop, ventilation is replaced by one-way, or direct, ventilation; so the savings are not so great when distributed through the whole mine, though much of the advantage can be secured from one-way, or direct, ventilation, where at least one heading of every entry goes out to the surface as a drift, slope or shaft. The limitations and disadvantages of one-way ventilation will be discussed in a future issue.

FREE ENTERPRISE

The Obligation of Management and Labor to Cooperate...in War...in Peace

The Invasion is on! We have unleashed our full might military victory. We have confidence that our great strength will bring success. We are strong because we have achieved unity in mobilization and in combat.

Though victory appears assured, we cannot rest until we have done everything in our power to speed the day when death and destruction are halted.

The home front is an important factor in this time of war, for the fighting power of our Armed Forces depends upon their weapons. Napoleon's army fought "on its stomach"—man against man. Eisenhower's men fight on their tonnage—tanks, artillery, machine guns, and bombers.

As never before in the long succession of wars, the deeds of heroic deeds on the battlefronts in this world conflict will be paralleled in history by the great accomplishments on the production fronts. Along with these heroic achievements of our Armed Forces, the world will remember the record of our production accomplishments which have made us the strongest military power in the world, as well as the arsenal of democracy.

As the conflict reaches its climax, as battles grow fiercer and more destructive, our responsibility becomes heavier and more critical. We must coordinate our productive efforts with the same ingenuity and the same precision with which our Armed Forces have coordinated theirs. We dare not waste the productivity of a single man or machine in these critical days.

As our landing craft are discharging our fighting men on the beaches of Europe and the Pacific, they must not lack for equipment. No interference with war production for any reason can be justified. There must be no strikes in America!

The landing of American troops in France virtually stopped all strikes in the United States. This is important and encouraging news because the prelude to invasion, unfortunately, has been an epidemic of strikes. The loss through strikes, during the first four months of 1944, was double that lost during the same period of 1943. April saw more strikes than any other month since Pearl Harbor, and in May the record again was broken. Here is what happened within two weeks in May:

Some thousand men in six Chrysler plants in Detroit were out when a jurisdictional dispute in a "soda pop" war between the American Federation of Labor teamsters and the

Congress of Industrial Organizations fired their discontent.

A three-day sit-down strike occurred among 950 employees in the B. H. Aircraft plant over the refusal of the company to discharge a superintendent unsatisfactory to the union.

Thirteen hundred men in the Chevrolet transmission and axle plant at Saginaw struck over a no-smoking rule and a change in shift-starting time.

Two thousand employees at the Browne and Sharpe Manufacturing Company walked out when a woman was hired to fill a job long held by a man.

Production of penicillin, blood plasma, and other medical supplies was halted at two Detroit plants of the Parke Davis Company as 1900 employees struck for a ten-cent raise.

Over 25,000 lumber workers in the Pacific Northwest struck because the War Labor Board denied their demand for a wage increase.

At the end of the third week of May, 70,000 workers in 26 plants in Detroit were idle because of strikes.

Strikes in Detroit alone reduced production as much as a moderately successful German air raid would have done. Far more important than their effect on output is the effect of strikes upon national unity and morale. To our home front and to our Armed Forces, strikes belie our pledge to back the attack with all the power at our command. Hence, strikes limit our all-out war effort.

Prompt and decisive action is needed to keep America free from strikes for the remainder of the war. Stoppages of work on the production lines cannot be condoned while lives are being lost in fighting the enemy.

Most union leaders realize this need and are preparing to impose discipline upon their members who violate the no-strike pledge. The Warehouse Division of the International Longshoremen's and Warehousemen's Union (C.I.O.) recently declared: "Strikes in this time of war are treason against the nation and betrayal of the interests of labor." A message sent by William Green to all heads of American Federation of Labor unions stated:

"D-day is here. From now on until Hitler is finally crushed, every worker enrolled in the army of production must consider himself a part of the invasion forces of the United States and conduct himself accordingly. I call on you in the name of the American boys who are risking their lives under enemy fire to maintain uninterrupted production under any and all circumstances. Until victory is won every worker must give the same all-out service that our Armed Forces are giving on the field of battle."

Strongest of all was the appeal of R. J. Thomas, president of the United Automobile Workers, to members of his union:

"Our union cannot survive if the nation and our soldiers believe that we are obstructing the war effort . . . there can be no such thing as legitimate picket lines . . . I appeal to our membership. If you value your union, if you want to live and serve after the war, we must restrain ourselves and our hot-headed brothers today. If we do not, there will be no union after the war."

Union officers are entitled to vigorous support from management and government in their efforts to prevent strikes. Behind many a strike is an accumulation of unsettled grievances. Managements are overworked, and many union shop stewards are new and inexperienced and do not always do their part in turning down cases which lack merit. Both of these conditions make it easy for large backlogs of unsettled grievances to pile up. A special drive to clean up unsettled cases and to prevent new accumulations of them is one way by which managements and local union officials can help shorten the war.

The government too has a contribution to make to the prevention of strikes—both through the prompt disposal of disputes and through firm action against the leaders of strikes. The National War Labor Board and the Regional Boards are disposing of over five thousand cases a month and have made an excellent record in reducing their backlogs. Nevertheless, the boards still have many old cases; and about one out of four strikes has been an effort to get action from one of the labor boards. The boards are entitled to cooperation from employers and unions in keeping down their docket. In instance after instance, cases are dumped in the lap of the board before the union and employer have made a real effort to get a meeting of minds and to work out settlements.

In the present emergency, strikes are an expression of the lack of adequate understanding and team work between unions and management. Any future great upsurge in industrial strife likewise will be due to misunderstanding. After this war this country must not go through another "1919" when the time lost from strikes reached an all-time high. With 13 million workers, or almost half of the non-salaried employees of the country, in trade unions, the power and prestige of unions is greater than ever. *The long-run prosperity of the country requires that business and labor learn how to cooperate in supporting the policies which produce the largest possible profits and the largest possible payrolls.*

Although business is primarily interested in the largest possible profits, and labor is primarily interested in the largest possible payrolls, both objectives call for the same basic conditions. Payrolls depend upon the prospects for profits. If bad relations between business and labor or unwise public policies cause employers to take a pessimistic view of the outlook for profits, both employment and payrolls will be depressed.

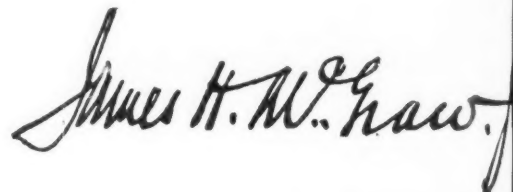
Individual unions and individual employers always will have differences over wages and hours and the status

of labor in particular plants or in particular occupations. Some disputes on such issues are inevitable, but resort to arbitration and calm intelligence can help greatly in avoiding strikes in the long run. Cooperation between labor and management is an economic necessity. In any kind of economy, payrolls and profits *both depend upon the willingness and the ability of business and labor to work together in creating the conditions under which enterprise flourishes.*

The foundation for intelligent and effective cooperation must be accomplished by skillful and imaginative managers in plants throughout the country who are willing to help unions with their problems, and who are willing to interest union leaders and their members in the problems of business. Union members and their leaders are keenly interested as a rule in the efforts of management to win new markets. They know that jobs depend upon the success of managements in improving the product, adding new items to the line, and, less frequently, cutting costs and prices. Employees like to be kept informed about what management is doing, what problems it is meeting, and what success it is having. Above all, they like to have an opportunity to contribute their ideas and suggestions.

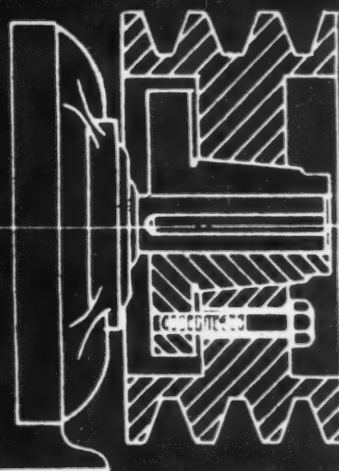
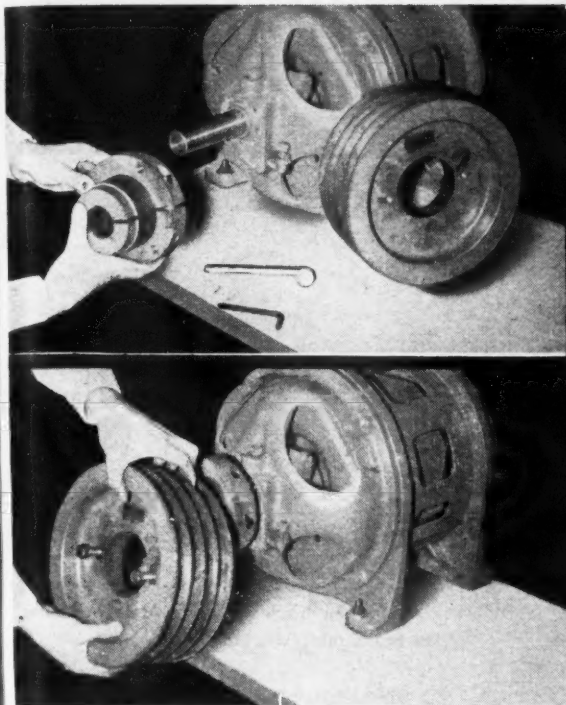
The recent epidemic of strikes should not blind us to the fact that even today there are more plants where managements and unions are on good terms than there were before in the country's history. Consider, on the one hand, the extensive and constantly growing efforts of unions to train and develop shop stewards and, on the other hand, the efforts of employers to teach foremen how to carry out the new responsibilities imposed upon them by union agreements. Unions and managements together are learning how to operate together such technical devices as time study and job evaluation. Managements which, several years ago, opposed the provision of umpires to interpret union agreements and to settle deadlocked cases today are taking the lead in suggesting such arrangements.

The war is reaching a crisis, and all groups in the country must be aware as never before of their common interests. This presents an opportunity which should be seized to lay the permanent foundations for more effective team work in American industry. Let us remember that the days when Europe was being liberated also were the days when unions and employers were making unprecedented progress in preparing American industry for the return of the service men by developing policies of cooperation between business and unions. Such cooperation will help achieve a peace worthy of our efforts and our sacrifices.



President, McGraw-Hill Publishing Company

NO OTHER SHEAVE HAS THESE 3 ADVANTAGES



Split hub makes installation easy. Hub stays put—only rim is changed. Bigger pull-up bolts—higher taper cone pressure.

Worthington's QD Sheave is easy to get on, easy to get off, yet always tight on the shaft

If you have ever been in the shop when old-fashioned sheaves were being changed . . . saw workmen sledging and prying and sweating to get one off and another on . . . got an earful of loose fits, tight fits, misalignment, then you'll appreciate these advantages of Worthington's QD sheaves.

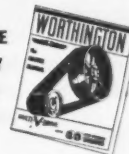
With the QD, the hub stays put, because a variety of sizes of rims fit it. When changes are made for different speeds, the rim is easily removed and replaced. On all other sheaves, the hub

has to be loosened, presenting a re-alignment problem when the hub is drawn up to the rim. Once you put on the hub of the QD sheave, alignment problems are permanently solved.

These advantages, plus those of the Worthington-Goodyear Endless Cord V-Belts, make the Worthington Multi-V-Drive the most trouble-free method of driving by V-belts.

Stock size sheaves and belts are available at strategic centers throughout the country.

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STATE-BOARD QUESTIONS

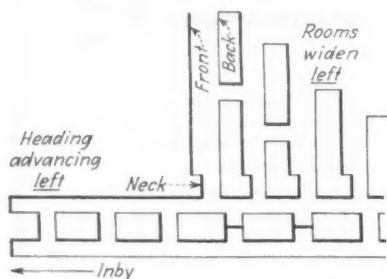
Coal Age Quiz

Room Widening Rule

Q.—In what direction should mine rooms be widened?

A.—If the room does not, for some reason, have to be widened both to the right and left, it should be widened inby, if the pillars are to be drawn as the entry advances, and outby, if the pillars are to be drawn as the entry retreats. Briefly, widen your rooms in the opposite direction from the location in which you expect to draw your first pillars. See accompanying illustrations and *Coal Age*, December, 1943, p. 89.

In other words, place the room track



Rooms turn their backs on the inevitable pillar drawing.

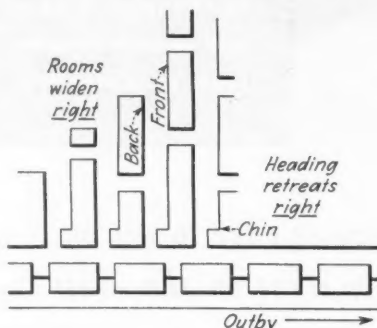
on the side of the room adjacent to what will be the room's shorter pillar when the pillars are being drawn. You will then be loading the car where the room still has two undrawn ribs for the support of the roof and where you are not in the goaf with only broken rock or a wide-open space on one side, as you would be if you were mining away the coal across the end of the longer pillar.

Work Toward Weight

Then again, as the roof rests on the far side of the shorter pillar, you will be mining (if you have the road against that rib) a part of the pillar on which little weight is resting until you have advanced to that far side. Then you can shoot that remaining stump down and recover it, for the weight will still continue to be on the far side of the shorter pillar, and the breakline will be angling toward the near side of the longer pillar, so that you will have a good chance to escape if the roof shows a disposition to fall. Every step taken toward your mine car will take you

nearer to safety, for with every step you get further outby, or further on the safe side, of the "line of support."

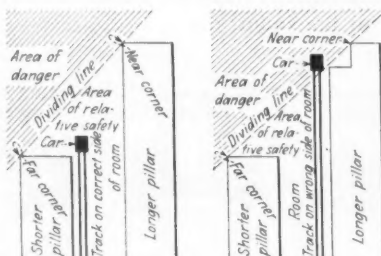
But if you have, by a disregard of the rule, put the road against the longer pillar, your first act will be to slice off the near edge of the longer pillar, which is the point in that pillar under a heavy load, and



Rooms look away, dreading loss of their pillars.

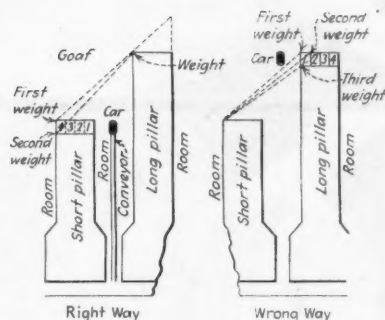
as you advance along the end of the pillar you will find the piece of the pillar just ahead of you is taking the weight in place of the edge you have cut off.

In short, the weight travels just in front of you, and you are in danger. But after a while the weight shifts to the new near edge of the pillar as it now has been



Mine shorter pillar and be safe.

reconstructed, which doesn't help you a bit, for now the weight is behind you and every step you take, when you try to get out toward your mine car, carries you inby across the line of support and into the real goaf, where support is either dubious or entirely absent. Even the car is well on the goaf, or unsafe side of the line of support and must stay there until the end cut



Even when track or conveyor is in center of room, mine shorter pillar.

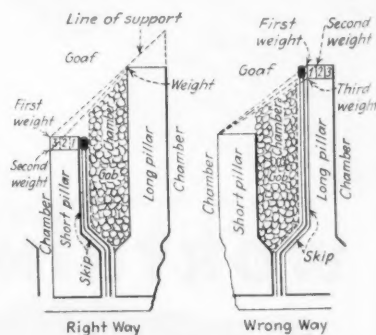
is completed. Heavy timbering alone will make such ill-considered work possible, though still unsafe.

Mine Shorter Pillar

If the room is widened both ways, inby and outby, and a conveyor is in the middle of the room, it still holds that the shorter pillar should be the one attacked from the room if safety is to be attained. If the place splits the pillar, and it is not widened at all, one pillar should be shorter than the other if the long pillar is being worked from another room and the shorter pillar should be drawn from this room and not the longer pillar. If a rib has to be skipped, it should be the rib of the shorter and not the rib of the longer pillar that is chosen for skipping (see sketch below).

One mine in the anthracite region that had nothing but pillars invariably skipped the wrong pillar and had trouble aplenty. There is really but one rule: "Mine the shorter pillar." Which way to widen is merely incidental to that imperious requirement.

It is understood, of course, that advocating the withdrawal of the shorter pillar



Skip short pillar, not long one.

IN Portable Cables



Tough!

means **HAZACORD REEL CABLES**

HAZARD LOCOMOTIVE REEL CABLE

CONSTRUCTION: Flexible tinned copper conductor, stranded for extreme flexibility, the standard stranding being 133 wires (7 strands of 19 wires each) for sizes 8 to 2 AWG, and 259 wires (7 strands of 37 wires each) for No. 1 and larger. Other strandings may be had if desired. The insulation is a Buna S Synthetic rubber compound, having high dielectric resistance, over which is an open mesh twine reinforcement. The outer jacket of tough, oil and acid resistant Hazaprene is vulcanized in metal molds to insure smoothness, toughness and long life.

Electric mining machines require a cable with outer covering tough enough to withstand a terrific amount of abrasion caused by a constant scraping, rubbing and pulling across mine floors and around rough corners. It must be built so that the insulation will not slip and bunch up in the guides as it is paid out and reeled back again. Heat-resistance is also a vital consideration.

HAZACORD Reel Cable, through the use of millions of feet in mines of all types, has demonstrated that it can "take it" and that in service delivered it is — TOUGH!

IMMEDIATE SHIPMENT: We are in a position to make immediate shipment of standard sizes of reel cable and parallel mining machine cable. Hazard Insulated Wire Works, Division of the Okonite Company, Wilkes-Barre, Penna.



HAZARD

INSULATED WIRES AND CABLES

FOR EVERY MINING USE



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from a room does not mean abandoning the longer pillar. That "longer pillar" is the "shorter pillar" of the adjacent room

and at the same instant should be in process of withdrawal by the miners in that room.

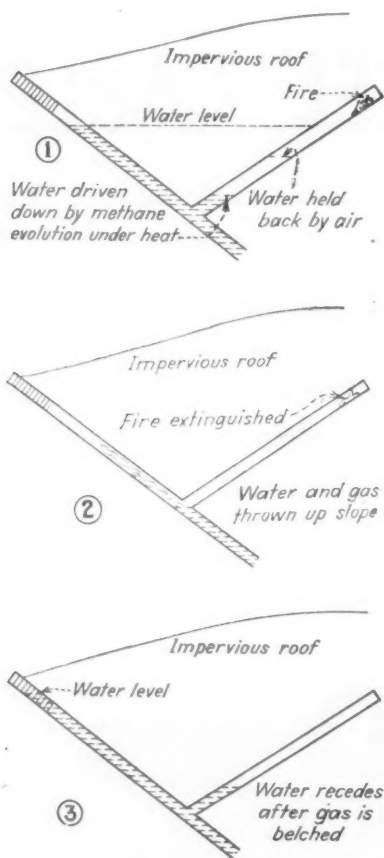
Mine Foremen, West Virginia*

Q.—Why is it not advisable to fight a mine fire by flooding? (1942, *Fires and Explosions*, p. 124)—continued.

A.—(Heavy damages to mine and equipment (this was discussed in *Coal Age*, May, 1944, p. 108). (b) Expense of dewatering the mine after fire is believed to be extinguished. (c) Impossibility of ascertaining if fire is extinguished. (d) Length of time that workings are idle by reason of flooding.

[(b) In a shaft mine, and often in a slope mine, the volume of water to be pumped is almost equal to the volume of the coal and rock that has been removed from the mine in all the many years of its operation unless subsidence has filled up some of the workings, though the rocks when wetted swell so that the volumes of water and of the combination of rock and coal will not be exactly equal. Coal is 1.25 times as heavy as water and rock still heavier, so the weight of the water will be 80 percent (or somewhat less) as heavy as that of the coal and rock that have been mined. To this must be added the water that has entered adjacent mines if any, and will have to be pumped with the water in the mine.

* Continued from June, 1944, *Coal Age*, p. 108.



Figs. 1, 2 and 3—Where Mine Belches Gas.

[Dewatering is accompanied in methane mines by some hazard, for the methane sometimes escapes at such pressures that it forces the water down in the working place. The water in the shaft or slope may then be so much higher than in the room that when the water is lowered in the shaft or slope it may allow the water to fall in the room below the mouth of the room, and that will free a big volume of methane which may be able to start its way up the shaft or slope. If the shaft or slope is being worked with open lights at a higher level or in a higher seam, the outflow of methane may be ignited at the landing in this higher level and an extremely severe explosion may occur, as happened in Kentucky (*Coal Age*, Vol. 1, p. 370). Such belchings of methane and air have dislodged men who were on a raft and were engaged in pumping the water out of the mine shaft. It has made necessary the use of closed lights in such dewatering operations despite the purity of the intake air in which the pumpers normally have to work.

High Pressures Likely

[It should be remembered that the pressure of gas in a rock or working isolated from the surface is equal at least to the hydraulic pressure of the water over the gas; otherwise the water will descend. It is possible, but unlikely, that the pressure of the gas will be greater than that due to the depth of the water at the mine portal because the portal probably is lower than the ground over the working. The pressure of the gas may be remarkably high if the rock is so dense that gas cannot be forced through it.

[It would seem unlikely that belchings would occur in the filling of the mine with water, if that proceeds rapidly, for the methane would not be emitted into the working rapidly enough to create such an action though the heat of the fire is greater than later and the water in the slope or shaft is lower and its pressure accordingly also lower. It is after some long period when the pressure of methane in the working has approximated its pressure in the coal and the water in the shaft or slope is being lowered that the hazard usually exists.

[More than one belching from a single working in the course of time is conceivable and belchings from several workings or levels are to be expected after one has occurred. These phenomena will occur where there is methane under pressure and are not necessarily restricted to the operation of pitching beds.

[(c) The back pressure of the air compressed by flooding into a heading or room, even without methane discharge, may prevent the water from even reaching the fire. As the water rises, it creates a back air pressure equal to the weight of water represented by the difference of elevation of the

top of the water in the room or heading and of the top of the water in the shaft or slope. The water never will get to the end of the room or heading unless the roof above that working is pervious and will let the air escape (see Figs. 1, 2 and 3).

[However, the combustion will deplete the oxygen to such a degree that the fire which it was intended to flood will be extinguished by lack of oxygen. The water will act as a very efficient stopping and its presence near the fire will cool the fire area. On the other hand, it may remove some of the carbon dioxide and convert the carbon monoxide to dioxide, and remove that.

[Loss of carbon dioxide to the water may prevent the oxygen from being depleted as rapidly as it should be to prevent the growing percentage of methane from reaching the explosive limit before depletion of oxygen provides against the possibility of an explosion. How important this consideration may be is not clear, as the water and carbon dioxide may not be in immediate contact.

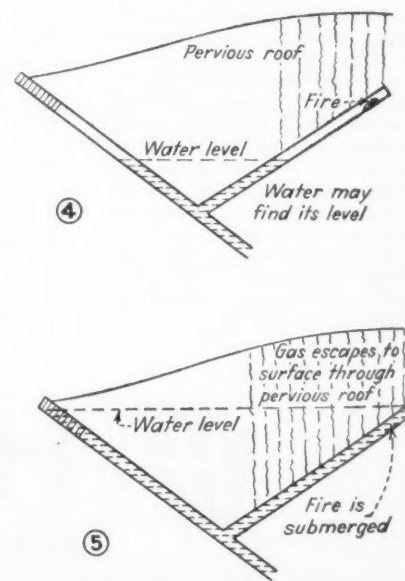
[The pressure of water and the lowered temperature will densify the atmosphere of the fire area, and both will cause the molecules of the explosive gas to come in closer contact with the oxygen. Consequently, the mixture will become more readily explodable. In other words, the range of explosibility of such gases will be widened, which will be an added hazard.

Danger of Gas Leaks

[If there is methane in the end of the room or heading isolated by flooding or in the adjacent pillars, the methane may escape to the upper workings through the rock; and workings that have been operated with open lights may have to submit to a closed-light regime. In this instance, the water may rise to the topmost or almost to the topmost elevations in the heading being flooded and may even rise into the roof (see Figs. 4 and 5).

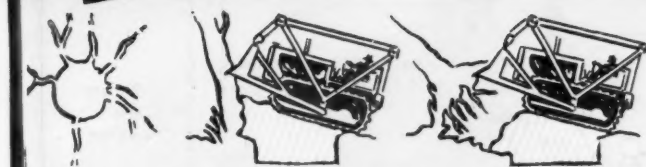
[(d) Flooding is the slowest means of contending with a mine fire.

(To be continued)



Figs. 4 and 5—Where Water Floods Fire.

HOW TO CUT CLEARING AND PIONEERING TIME with a LeTourneau Dozer



TREE REMOVAL

You can quickly and easily take out trees up to 30" in diameter with a LeTourneau Dozer this way:

1. Dig out dirt and cut roots on side where you are going to push . . . then dig out dirt and cut roots on right and left side of tree.
2. Build a ramp with the excavated dirt and place the Dozer blade high up the tree for greatest leverage.
3. Push tree over. When it starts to fall, back up immediately so root ball won't swing up under the blade. Then doze it aside. Thus, one man and one machine do the work of a whole clearing crew.



PIONEERING SIDEHILL CUTS

To open sidehill cuts and benches:

1. At top of slope, make two or three passes across the planned cut and pile up dirt along the outside edge to form a windrow.
2. Then, back the tractor around and pull it parallel to the slope with outside track on top of the windrow.

This tilts the tractor in toward the bank and eliminates tendency for it to slip off the edge of the loose fill. Always keep the cut low on the inside.

HOW LeTOURNEAU DOZER FEATURES HELP MAKE THIS WORK EASIER

HIGH BLADE LIFT—The high blade lift (35" to 48" depending on model) of LeTourneau cable-controlled Dozers gives you extra leverage for pushing over trees, uprooting stumps and reaching high up on banks to knock down materials.

LOW DROP—Extremely low blade drop (60" to 72" depending on model) enables LeTourneau Dozers to reach farther down banks when opening the top edge of steep, sidehill cuts.

STOUT, LIGHT-WEIGHT WELDED CONSTRUCTION—Arc-welded steel construction of box-beam design—pioneered by LeTourneau—assures maximum strength, necessary for this heavy clearing and pioneering . . . with minimum weight . . . is easily repaired in the field.

POWER UNIT INTERCHANGEABILITY—Like all LeTourneau mining tools, LeTourneau Dozers are cable-controlled through a fast-acting Power Control Unit mounted on the tractor. Thus, with

a 2-drum rear-mounted Power Control Unit, Dozer can be combined with a LeTourneau Rooter on the same tractor, to break up hard, rocky material, without blasting, for fast, low-cost stripping. Many smart mining companies operate Dozer from a front-end PCU. This leaves rear of tractor free to mount a 2-drum PCU for LeTourneau Carryall Scraper stripping, lifting heavy loads with a Tractor Crane . . . or for other drawbar use. This money-saving LeTourneau equipment interchangeability gives you more mining uses for your tractor and helps increase production with fewer units and men.

Our Field Engineering Department will gladly give you practical operating and planning help on your own particular coal stripping job. Write today!



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TIMELY OPERATING IDEAS

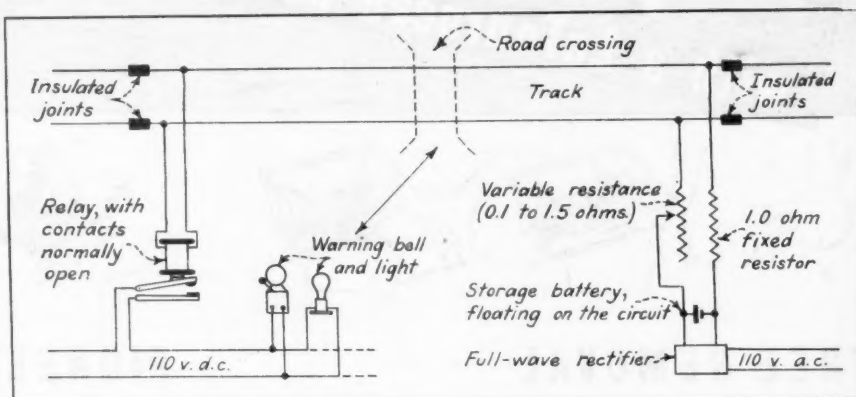


Electricity Guards the Crossing

THE JOB of crossing watching at his plant has been delegated to an automatic signal system, thus relieving a watchman for more active work, writes P. C. Ziemke, Oak Ridge, Tenn.

"During these war days of both manpower shortage and materials' priorities, it becomes increasingly difficult for management to protect the lives of men in or about the mine and the reduction plant. There was a time when guarding a crossing meant a job for some superannuated employee or some crippled individual in need of lighter work. However, even the old men and the handicapped individuals have more important work to do these days than to sit idly in a watchman's shack.

"The accompanying diagram illustrates the circuit employed to electrify a section of standard-gage track passing through a congested area of our plant. The combination of battery charger and battery provides 24-hour watchman service on this track, even when power fails, which usually makes most circuits inoperative.



"The rail-joint insulation is the conventional fiber material used on Class I railroads, and the rest of the equipment was selected from the used material found about any large plant. Crosotied wood ties laid in crushed rock have kept the insulation to a minimum, even in wet weather.

"Eight 10-in. d.c. vibrating bells located at strategic points about the plant and wired in parallel with 60-watt red lamps," says Mr. Ziemke, "warn of approaching trains at all times. The 110-volt current for the bells and lamps is furnished by a take-off on the station battery."

Locomotive Carries Rumble Platform

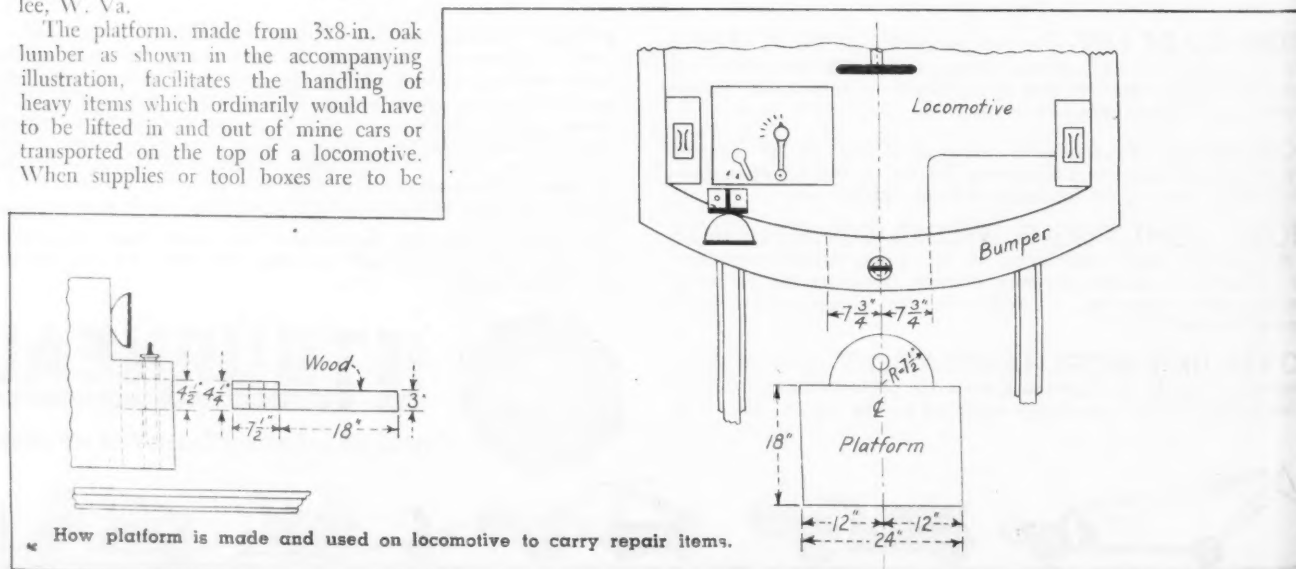
A WOODEN PLATFORM inserted into the bumper of a locomotive serves as a handy carry-all for moving small stationary motors and other items, declares E. C. Hitchcock, night electrician, New River Co., Summerlee, W. Va.

The platform, made from 3x8-in. oak lumber as shown in the accompanying illustration, facilitates the handling of heavy items which ordinarily would have to be lifted in and out of mine cars or transported on the top of a locomotive. When supplies or tool boxes are to be

taken inside to a repair job, or in certain instances where items are to be sent to the shop, this platform is pressed into service.

In low coal, where headroom is hard

to get, this platform helps to solve the problem of handling supplies. Mr. Hitchcock says the platform is kept at the motor pit when it is not being used.



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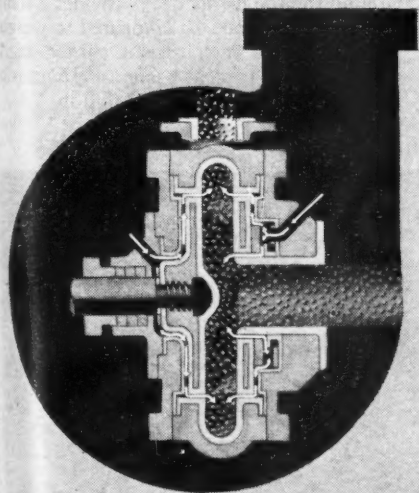
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COAL AGE



The "River Runs into the Ocean" Principle Saves Power in Abrasives Pumping



Difference in pressure, caused by the down-hill flow of rivers to sea level, keeps the salt water of the oceans from flowing up rivers. A comparable "difference in pressure" in Hydroseal Pumps, keeps the abrasive or corrosive material being pumped from flowing into the annular clearances between the impeller and the pump side plates. Arrows in the diagram at left indicate the hydrosealing flow of clear water, which prevents excessive abrasive wear on these clearances. This results in power savings of one-third to one-half, i.e., you can pump further with a given size motor or you can use a smaller motor to do a given job. The Hydroseal Principle, in conjunction with "easily replaceable" Maximix Rubber Parts maintains these initial efficiencies throughout the life of the pump. "How" is explained in our Catalog No. 140. . . . Write for it.

HYDROSEAL ABRASIVES AND CORROSIVES MATERIALS HANDLING PUMP

THE ALLEN-SHERMAN-HOFF CO., 231 S. 15th Street, Philadelphia 2, Pa.

Offices or Representatives in most Principal Cities

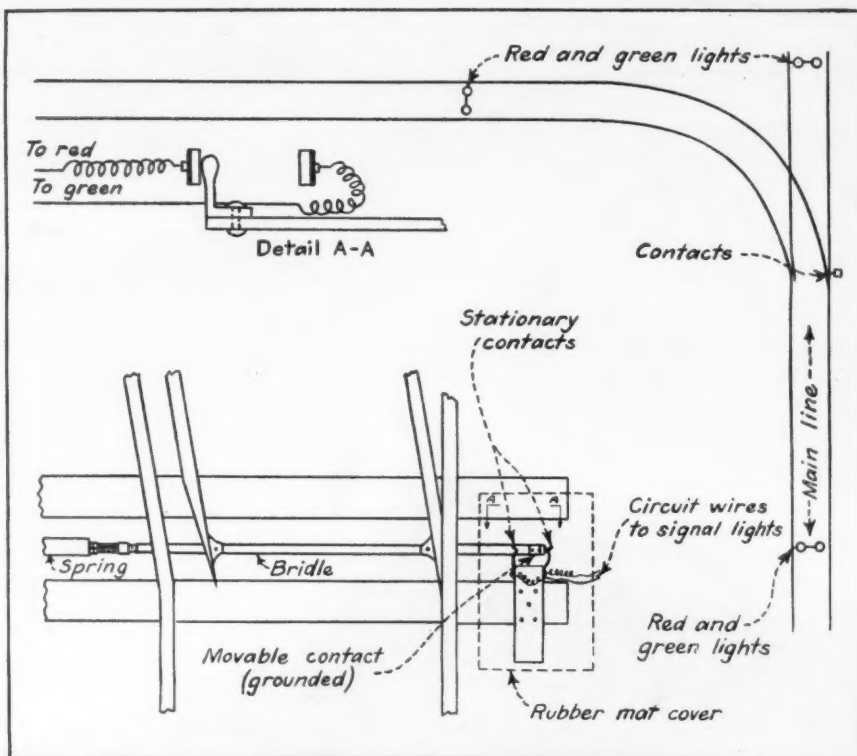
Three-Way Switch-Position Indicator Costs Little

"SIGNAL LIGHTS indicating the position of switch points are installed at all strategic points on main and secondary haulageways at the mine of the Powhatan Mining Co., Powhatan, Ohio, to enable motormen to determine which way the switch is aligned," writes Edward Fellabaum.

"This is done by a very simple arrangement, shown in the accompanying sketch, employing only two controller fingers and one contactor tip at each switch. We use tips and fingers that have been discarded and for insulation we use pieces of rubber belting that is no longer suitable for conveyors. This same belting also is used to cover all exposed parts. Short pieces of rubber hose incase wires leading to fingers.

"By this arrangement signal lights may be placed anywhere desired, as well as on straight track in the vicinity of switches. In case the switch should be left 'cocked' neither light will burn, and this, of course, indicates caution. We have indicating lights where needed at various distances (up to 1,000 ft.) from the switch, inby the turns at junction points, at sidetracks, etc. Cost of material to install them and maintenance also is small.

"At Powhatan we consider them indispensable," Mr. Fellabaum states. "They are of tremendous help, safety and convenience. They are absolutely necessary at derail switches."



How switch-position indicator is made and used.

New Smooth-Riding Inspection Car Sticks to Track

EXPERIENCE with lightweight inspection cars getting off of the track, especially on sanded curves, led a company in the Pocahontas field to design and build a car that overcomes the disadvantages of the earlier types. Several months' experience with one of the new cars has proved it stays on the track, has ample power to transport eight to ten men and affords very comfortable riding.

Two differentials and their axle assemblies from Ford Model A cars constitute the basis of the design. Suspension is 3-

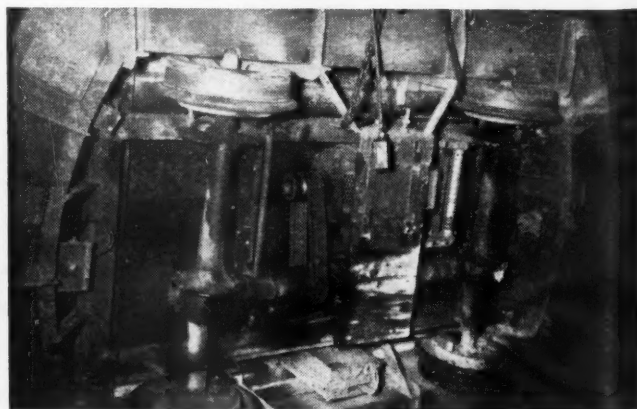
point—that is, coil springs are used over each axle on one side but on the other side the suspension is an equalizer bar with a spring at its center. A drive shaft connecting the two axles is rigid but the torque tubes are free of each other so the axles can play separately. A 5-hp. 250-volt d.c. motor, compound wound, drives the car through a single-reduction 4-strand V-belt. A small drum controller with built-in reverse is mounted with its top about flush with the top of the deck.

The regular Model A mechanical brakes

on all four wheels are connected by a rigging to a handwheel control. The flanged track wheels are bolted to the hubs by the same bolts as were used for the automobile wheels. The flat-top wooden body, 18 in. above the rail, affords seating space for ten men. A wooden running board all around serves as a foot rest and a 3-in. pipe around the top of the deck provides a hand hold. Power of the car compared to weight and friction is such that it carried eight men up an 8-percent grade at 16 m.p.h. Weight of the car alone is 2,000 lb.



Streamlined for utility and safety and not primarily for looks.



Four-wheel drive and brakes with differential wheel action.



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space for
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The "Facts of Life" for wire rope users . . .

EVEN when you start with a good wire rope—such as American TIGER BRAND—treat it right if you want it to give all the life that is built into it.

In this handy 48-page booklet are the things every wire rope user should know about proper rope handling and care.

The easy-to-follow instructions and the practical suggestions it offers are based on the experience of thousands of rope users. They will help you avoid the common errors that shorten rope life and reduce operating efficiency.

Subjects covered include — correct handling of ropes, how and when to lubricate, attaching of clips and sockets, splicing, care of sheaves and drums, minimum safety factors and many other helpful

hints that will show you how to keep your wire rope operating at maximum efficiency and for the longest possible time.

Right now, with seasoned operators few and far between, this handy guide to better rope performance is doubly valuable. This booklet is free. Send for as many copies as you need and get them into the hands of the right men.

Send for FREE WALL CHART, too

The ten vital rules of wire rope care and handling are graphically illustrated and briefly described in this attractive wall chart. Printed in colors, on a 15" x 21" heavy cardboard mount, it can be placed for ready reference wherever wire rope is being used. Acts as a constant reminder of good wire rope operating use and practice.

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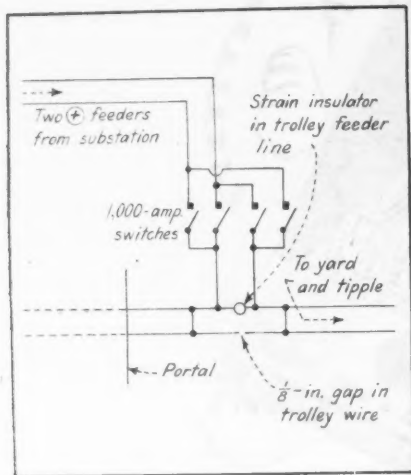
For Anthracite Service: Miners Bank Building, Wilkes-Barre, Pa.



UNITED STATES STEEL

Special Frogs and Switches Used for High Amperages

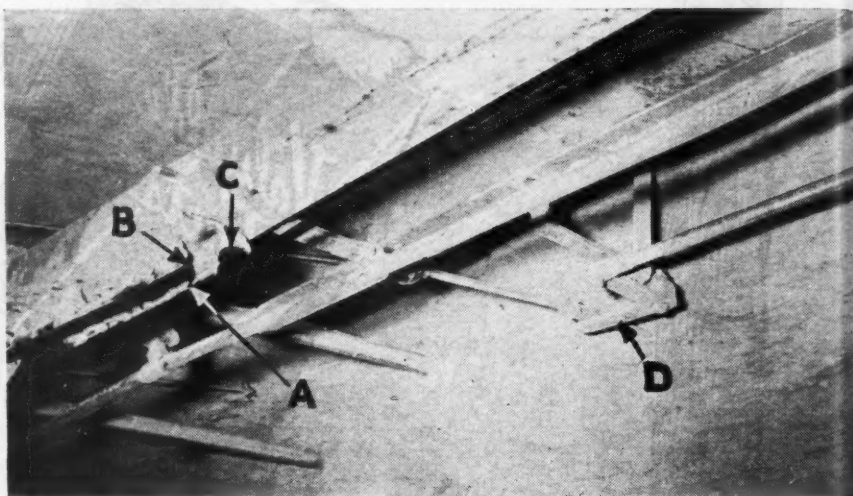
WITH 1,500 TO 2,600 AMP. flowing from a trolley wire through a collector shoe to a locomotive, a rough spot which causes a break of contact or even a poor contact results in an arc or a fusion heat which quickly burns and destroys the parts affected. When new Westinghouse 20-ton 250-volt locomotives, two of each used in tandem, were installed at a large mine in



Connections to feed and sectionalizer.

the Pocahontas field, steps were taken which eliminated those troubles commonly encountered with extra heavy 250-volt equipment at trolley frogs and section insulator switches.

Instead of pan-type stationary trolley frogs, switching frogs were installed and connected to the track switches by bellcranks and rods. In the operation of this trolley switch the outby end of the "straight" trolley wire is flexed to align with the fixed end of either the straight or turnout wire, as the case may be. A gap of only $\frac{1}{8}$ to $\frac{1}{4}$ in. presents practically a



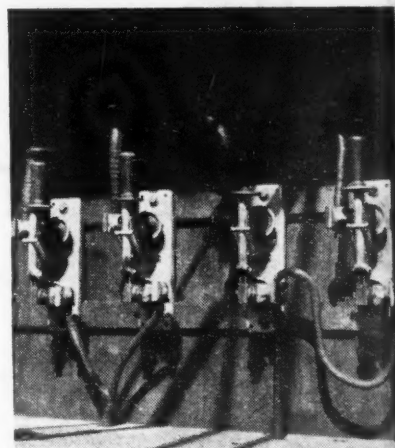
Trolley-wire switch that displaced frog is interlocked with track switch. "A" points out the small gap as the wire is aligned for the straight; "C" the insulated hanger which is shifted, and "D" bellcrank in mechanism connecting with track switch.

smooth surface for the shoe of the collector.

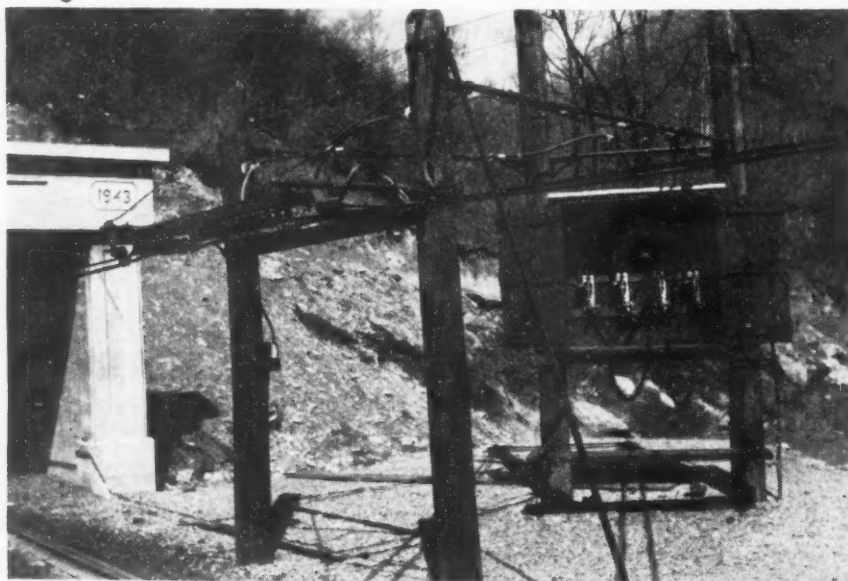
Section insulator switch installations comprise two separate units: a gap of $\frac{1}{8}$ in. in the trolley wire and the knife switch or switches mounted nearby. When closed, which is normal operation, these switches bridge electrically the gap in the wire.

An installation near a main portal is illustrated by the drawing and two of the halftones. This is combined with a power intake point so that either or both sides can be disconnected from feeders coming from an outside substation nearby. Four quick-break knife switches (Elreco, 1,000-amp.) are used instead of two, for reasons of capacity and availability.

On the 20-ton locomotives the length of contact of the pole shoe is 6 in., thus spanning the small gaps in well-aligned ends of trolley wires without breaking the current and causing an arc.



Four 1,000-amp. quick-break switches feed the trolley and at the same time bridge the gap of the section insulator.



Feeder and section insulator installation at portal.

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reduce wear, cut maintenance costs,
help insure maximum tonnage

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ice Engineer will recommend a quality lubricant of the proper type and grade for each machine and moving part. In many cases he will also suggest better methods of application, which will not only insure better lubrication, but will help improve safety records.

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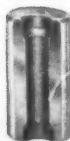
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Long life, replaceable, hardened alloy steel Connector Insert gives new factory joint accuracy to a worn connector



Easily removed heat treated Rivet holds Bearing Pin against longitudinal displacement.



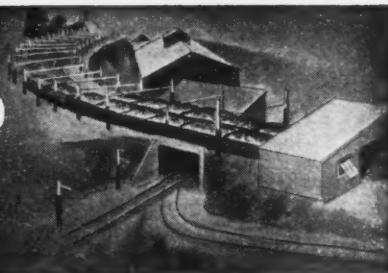
Hardened Eccentric Pin is designed so it can't turn in block... puts joint wear between pin and insert.

THERE'S smooth working harmony wherever Cincinnati Chains, Bits and Cutter Bars are used . . . and greater production at a lower cost, too. Cincinnati Coal Cutting Equipment, made of high grade alloy steel, is the kind of equipment you can depend on to meet tough production schedules. Cincinnati Chains, Bits and Bars practically eliminate shutdowns . . . reduce power costs . . . give larger cuttings and cut down on maintenance time. For Dependable Cutting Performance, it's CINCINNATI MINE™.

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COAL AGE NEWS ROUND-UP



Burke Signs; Ratify Anthracite Pact

Signing of a wage contract with the United Mine Workers by southern Appalachian operators, ratification by the miners of the anthracite pact and return of most of the mines to private management highlighted developments on the labor front during the last month. According to a union representative, Edward R. Burke, president, Southern Coal Producers' Association, signed on June 16 an agreement carrying the same provisions as that approved by the War Labor Board May 19 for northern and western mines.

The contract signed by Mr. Burke was in behalf of all the southern Appalachian operators except the Jewell Ridge Coal Corp., of Virginia, which has withdrawn, as of June 15, from the association and will remain under government control until a contract is negotiated with the union following final decision in the company's court action against the union on the legality of portal to portal pay, unless the government elects to terminate control prior thereto.

Following two weeks of debate, the agreement was reached between Mr. Burke and U.M.W. President Lewis, a letter from the former emphasizing the stipulation that during the pendency of court proceedings in the Jewell Ridge case the union agreed to urge upon its men employed by the company the fullest cooperation in producing coal. It also was agreed to limit the vacation period to the Fourth of July.

The anthracite pact was ratified June 16 at Hazleton, Pa., by a vote of 355 to 15, after President Lewis said that the terms were the best possible in view of "the shabby treatment" of the miners last year "by the President of the United States and his administrative agencies."

Reviewing the months of negotiation in which the miners struck four times, Mr. Lewis said to delegates of the three anthracite districts: "We got all there was to get. There isn't any more. The government has spoken. Under the justification of the war emergency, things can be done by the government that cannot be done in times of peace."

Warning the miners to be extremely cautious in observance of the agreement and to be certain that production was not interrupted, he added: "The machinery of the government is operating against the United Mine Workers. Why place yourselves in positions where you are

vulnerable. Executive order is the law today. If there is anything that can be construed as interfering with production, you can be certain the machinery of our government will turn against the mine workers."

Through a higher base rate, work for 15 minutes of the lunch period, vacation allowances and other provisions, the contract gives a wage increase amounting to a little more than \$1 a day. It expires April 30, 1945.

Following notification that the bituminous operators would put into effect immediately the new wage agreement approved by the War Labor Board May 19, Secretary of the Interior Harold L. Ickes on May 31, seven months after he had taken possession of the mines a second time, returned to private possession and control government-held mines producing 60 percent of the nation's bituminous coal. By this action, according to Mr. Ickes, management and labor "are now on trial to prove to the nation that they can fulfill wartime responsibilities

under their own power." On June 2, Utah mines were returned to their owners; June 10, mines of the Koppers Coal Division, Eastern Gas & Fuel Associates (17 in West Virginia and 1 in Kentucky), and Colcord Coal Co. (four mines in West Virginia); June 13, all mines in Montana, Wyoming, Idaho, Arkansas and eastern Oklahoma. On June 21 Mr. Ickes announced that a blanket order had been issued terminating government possession of all anthracite and bituminous mines except those of Jewell Ridge.

Schuylkill Silt Row Is Clearing

An end to pollution of the Schuylkill River by silt from anthracite breakers, which has plagued Philadelphia for years, seems to be in sight since the State Sanitary Water Board has set dates for mine operators to submit plans to halt the practice. The 150-mile river bed is said to be clogged with an estimated 25,000,000 tons of coal dust, blocking intakes of other industries, making costly the drawing of drinking water for the city, causing floods, and, in times of drought, causing ill-smelling mud banks.

The Water Board's order provides that mine operators:

Present by July 15 a report on the origin, character and quantity of waste waters draining from their mines.

By Sept. 1 submit a general plan for removing silt from the drainage.

By Nov. 1 submit detailed plans and apply for a permit to effect the removal and, as promptly as priorities on equipment and labor allow, construct treatment works to remove substantially all the settleable solids by quiescent sedimentation.

In general, these works will consist of impounding basins. Several large coal companies already have begun work on such basins, and all of them have accepted the board's plan and pledge cooperation.

Encouraged by this development, officials of municipalities along the stream have started a drive to obtain federal funds to further the work. At the request of Pennsylvania's senators, the Senate Committee on Commerce has requested the Army Engineers to review their recommendation of 1938 that government funds be not used for that purpose. Rep. Francis J. Myers also has sought a \$10,000,000 appropriation as a flood-control measure. The total cost of cleaning up the river bed is estimated at \$20,000,000 to \$25,000,000.

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Please don't put off renewing your subscription to Coal Age. If you delay too long all we can do is put your name on the waiting list, where it may be months before it comes up. And even when your name does come up we shall not be able to supply missing copies for your file. Paper is extremely short due to war conditions. Like all other publications, we have had two cuts in paper supplies and are operating under a fixed allotment. We have not cut editorial content nor have we reduced the number of subscribers. We froze our circulation at the current figure and now, as new subscriptions come in, cut off subscriptions promptly on expiration—not, however, without giving each subscriber ample opportunity to renew.

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Thin Coals, Water and Coking Examined

Lexington Meeting Brightens Future of Thin Seams, Points to Reductions in Pumping and Shows Kentucky's Interest in Research

LARGE SAVINGS in mine pumping and up to 30 percent in sinking shafts if practically all water is shut off by pregrouting; an opinion that plants to distill Kentucky coals at low temperature at the mines and make gasoline for local consumption would pay; and an assertion that, with machinery now available plus developments in the making, thin-seam coals will be able to compete with the thicker were some of the conclusions voiced in papers and discussions at the Lexington meeting of the Central Appalachian Section, American Institute of Mining and Metallurgical Engineers, May 20.

Speaking at the dinner, Senator Alben W. Barkley got his biggest hand in a statement that "we should never permit the American Navy to be reduced to the extent that it will be less powerful than any other two navies." With cooperation between government, states, counties and cities in working out a fair system of distribution of postwar materials he sees a bright future for private business. He thinks the tax bill can be reduced from 44 to about 20 billions.

George E. Keller, manager, Commercial Testing & Engineering Co., Charleston, chairman of the section, presided at the business meeting. E. R. Price, Wheelwright, Ky., general superintendent of mines, Inland Steel Co., and section vice chairman, steered the technical session. John C. Nichols, executive vice president, First National Bank & Trust Co., Lexington, was toastmaster at the dinner. Trips included a visit to the new low-temperature coking and hydrogenation pilot plant at the University of Kentucky.

Meeting sponsors were the Big Sandy-Elkhorn, Harlan, Hazard, Williamson and Southern Appalachian coal operators' associations; Big Sandy-Elkhorn, Harlan, Kentucky River and Pond Creek Tug River mining institutes; and the Kentucky Coal Agency. Local arrangements were made by G. Moss Patterson, chief, Department of Mines and Minerals, and Louis W. Huber, Mine Safety Appliances Co.

C. S. Crouse, head, Department of Mining and Metallurgical Engineering, University of Kentucky, reporting on "Research on the Low-Temperature Processing of Coal," stated that the 1-ton-per-hour pilot plant at the university is nearing completion and will start operation soon. Retorts, two in number, are 24-in. pipes set on an angle which is variable up to 7½ deg. These are internally heated with hot gases entering the lower end and moving counter to the coal. Pressure will be kept slightly on the vacuum side. Fixed gases will be used to heat the retort and the quantity will be greater than necessary. Prof. Crouse feels certain that in a commercial project the excess will be enough to fire boilers, making the plant self-supporting from the heat standpoint.

Motor fuel of 90 to 100 octane can be produced in quantities of 30 to 35 gal. per ton of Kentucky coal. Spraying into the coal retort heavy tar or heavy crude petroleum can greatly increase the high-octane motor fuel and the carbon content of the coke and thereby reduce the percentage of ash in the latter.

Questions put to Prof. Crouse drew the following: Low-temperature plants at mines in Kentucky can succeed financially by producing gasoline to be sold within trucking distance. By "low-temperature" is meant 1,000 to 1,200 deg. F. and perhaps up to 1,400 deg. The char can be used in place of low-volatile coal for mixing with high-volatile coals in making metallurgical coke. The pilot plant will be started on minus ¼-in. coal. It is hoped that getting the plastic mass through the retort has been licked by a design including a series of hammers. Char,

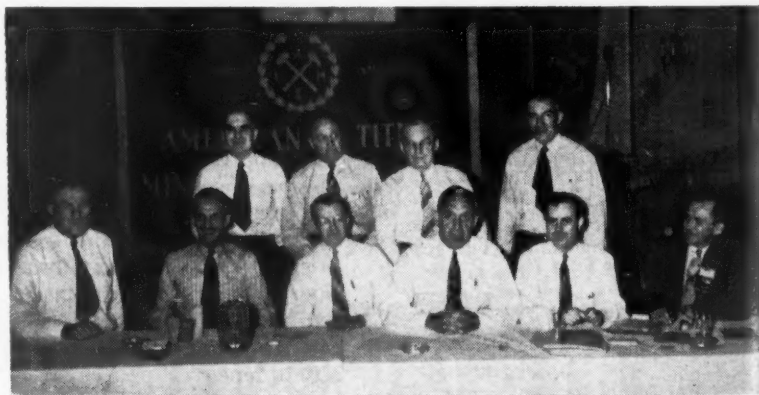
while not as dense as high-temperature coke, is not particularly friable.

Discussing the reasons for the low-temperature research, Prof. Crouse declared some new outlets for Kentucky coals are necessary to prevent a depressed condition after this war. The difficulty lies in the fact that Kentucky coals have to be shipped through other coal-producing states to find markets. Smoke-abatement measures will be accelerated after the war. The char from the low-temperature process can be burned as easily as raw coal and is smokeless. Prof. Crouse quoted at length from the article, "Coal's New Horizons," by Harold L. Ickes, which appeared in April, 1943, *Coal Age*.

Veleair C. Smith, consulting engineer, Charleston, asserted that other men who should be in the know place the petroleum reserves of this country at over 100 billion barrels as contrasted to the 20 billions



Senator Alben W. Barkley painted a bright picture for private industry.



Some of the speakers, officers and discussers rounded up at the end of the technical session. Left to right, seated: Caryl Robinson, B. H. Mott, E. H. Johnson, E. R. Price, George E. Keller, G. R. Spindler. Standing: Lionel Farr, John L. Clarkson, Carl Scholz, Veleair C. Smith.

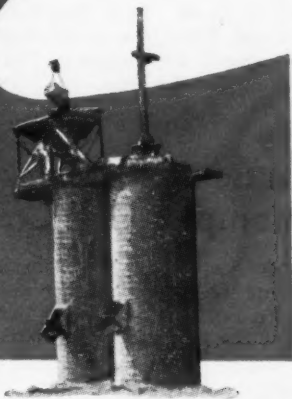
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ators in every coal mining section throughout the country.

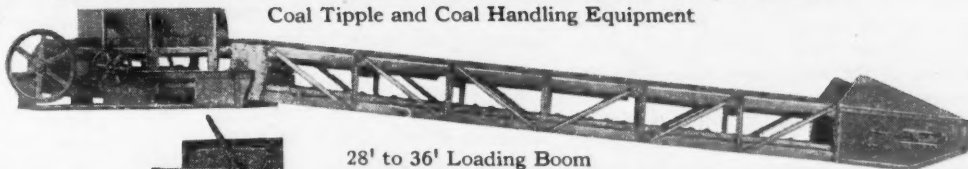
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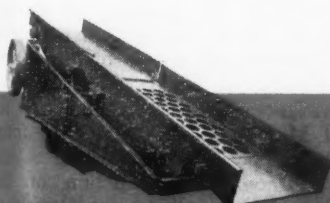
Sand and Gravel Equipment



Coal Tippie and Coal Handling Equipment

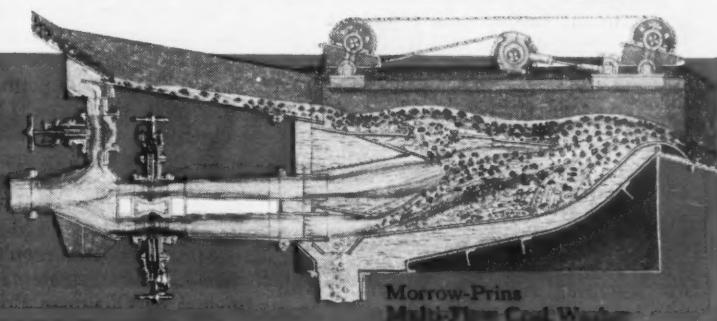


28' to 36' Loading Boom



Retail Screening Unit

Bin Gates and Chutes



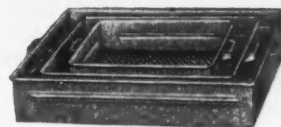
Morrow-Prins
Multi-Flow Coal Washer



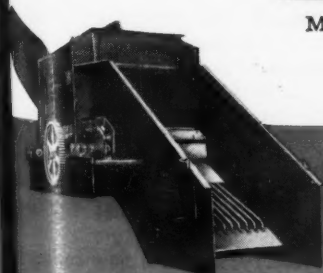
Sturdy Apron Feeders



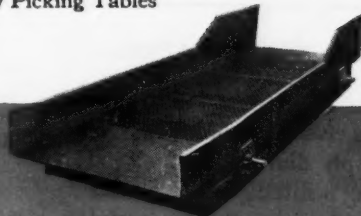
Morrow Picking Tables



Hand Testing Screens

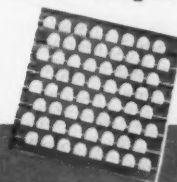


Straight or Hopper
Plate Feeders

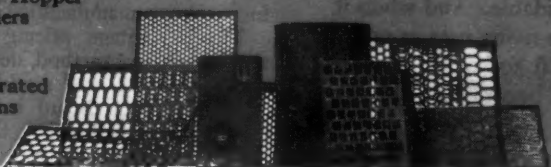


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enunciated by Mr. Ickes. Mr. Smith believes in the larger figures and therefore felt that any plants to produce gasoline from coal must be able to do it competitively. The Birmingham plant in England, formerly working on low-grade coal and now almost entirely on coal tars, requires two man-days to produce a barrel of gasoline.

Grouting to seal off mine water, said B. H. Mott, president, Mott Core Drilling Co., Huntington, W. Va., was being done 15 years ago, but at that time the core-drilling machines weighed five times as much as the modern machines and the grout, pumped into the top of the hole without control, sometimes traveled miles as compared to present scientific methods whereby it is confined to the immediate vicinity of the shaft or mine heading.

Mr. Mott mentioned an instance where grouting an existing shaft to cut off an influx of 70,000 gal. per 24 hours eliminated pumping and saved the grouting cost in a short time. Last year his company applied 231 carloads of grout in spite of a marked decrease in the quantity used per hole.

In this work the hole is first surveyed in sections by using packers and pumping water to determine the pressures at which grout will be accepted and in what quantities. These results are checked against the log of the hole indicating cracks and crevices. Where such are present, bentonite or rock dust may be used to effect a seal with a saving in cement. By varying the degree of bypassing from the grout pump to the mixing tank a pressure control is effected that is advantageous on most jobs and highly necessary in grouting old shafts with linings so weak that otherwise there would be danger of caving them in.

In addition to pregrouting where shafts are to be sunk and the grouting around existing shafts, the same general method is being used to solidify wet strata through which mine entries are to be driven; for instance, under creek beds. This may be done from the surface or be done underground by drilling holes ahead in the roof, bottom or ribs at an angle to the heading center line. Mr. Mott stated, however, that no way has been found to seal off all water in every case. A shaft contractor wants to know if a site has been pregrouted and if the water will be within the limits of 10 to 15 g.p.m., which can be handled easily.

Mr. Smith said he understands that some shaft contractors will agree to prices as much as 30 percent cheaper if the water has been sealed off to a few gallons per minute. Carl Scholz, consulting engineer, Charleston, recounted his difficulties from excessive water and gas in sinking the Glen Rogers (W. Va.) shaft in the years before pregrouting was developed. Pumping sawdust into the crevices was first tried, but without much success. Home kitchen tests proved that dried lima beans had great swelling power, so three carloads of these were used in completing the shaft.

In arriving at a conclusion that thin-seam coals can compete with thick coals, Carel Robinson, consulting engineer, Charleston, pointed out that only about

25 percent of the total cost to the consumer is affected by thinness of the seam. Sales costs and transportation costs from mine plant to consumer are no greater. He recounted how in the early thirties thin-seam mines, forced to conveyors, achieved costs under those in thick coals. Now the pendulum has swung back by reason of the widespread installation of loaders in thick-seam mines. At present the thin seams are handicapped by: (1) labor shortage, (2) the necessity to make additional height, (3) difficulties in delivering supplies, (4) the cost of cutting the coal, which varies almost inversely with the seam thickness, and (5) more difficult haulage.

Providing greater headroom for man travel, special man cars and shortened underground travel where possible to make new openings were advocated by Mr. Robinson. For moving supplies he pointed to the development of a machine consisting of a double-drum hoist mounted on caterpillar trucks for dragging timbers, conveyor pans, etc. The timber-setting track and saw, as now used in thick coal, can be developed for thin coal. In cutting, more attention should be paid to special bits and the bugdusting should be done by machine. He mentioned that the Goodman Mfg. Co. has a bugduster that is doing good work. Adequate heading height should be provided for large mine cars. Better illumination is needed at the face and more careful time studies should be made of each man in the crew.

Mr. Robinson suggested that manufacturers develop the following as soon as war conditions permit: (1) improved metals for bits, (2) ropes of higher tensile strength that will permit use of smaller sheaves in thin coal; (3) pans made of lighter and stronger alloys; (4) headers of light alloys; (5) quicker methods of bolting or otherwise joining pan sections, (6) portable saws and timber setters for low coal; and (7) bugdusters.

After Mr. Robinson's talk the three manufacturers' representatives present were invited by Chairman Price to answer any questions. E. H. Johnson, of Jeffrey, said that although the new 43L combination machine is achieving some fine results it is difficult to build and can't be put into regular production under present war conditions. Whether or not to adopt incentive pay he sees as a tremendous

problem for management. Four- to six-ton storage cars on wheels such as were used with the old Jeffrey entry drivers are not practical now because the high-capacity loading machines would require cars of impractically large physical dimensions. Some Illinois operators have achieved 20- to 30-second car changes as a regular practice.

John L. Clarkson, of the Clarkson Mfg. Co., said that the new Clarkson loaders can be used successfully in coal as thin as 38 in. Lionel Farr, of Goodman, stated that duckbill loading can be done in coal as thin as 28 in. Now that a constant flow of coal from face to tippie is close to achievement, the present problem is to improve cutting machines.

Coal Scores Victory In Memphis Gas Case

A major victory was scored by coal in its attempt to prevent further encroachment of natural gas on existing coal markets when the Federal Power Commission, by an order dated June 10, dismissed the application of the Memphis Natural Gas Co. The Memphis company had filed an application for leave to add 61 miles of pipeline to its existing facilities, thereby completing a double line from the Monroe field in Louisiana to Memphis, Tenn. The additional facilities would have permitted the company to increase its gas sales by an amount equal to more than a quarter million tons of bituminous coal annually.

The National Coal Association and the United Mine Workers of America intervened in opposition to granting a certificate authorizing construction of the facilities, offering extensive evidence through T. J. Hoffman, vice president, West Kentucky Coal Co., a witness at the hearings.

New Price Method

An alternative pricing method, effective June 14, for sales of used construction equipment limited to tractors, shovels, draglines, cranes and backhouses, urgently needed for essential operations in coal stripping, logging and petroleum production, was announced June 10 by the Office of Price Administration.

The new method provides a sliding scale of prices, in terms of percentages of new base prices for the equipment. This will increase the present maximum prices by adding 5 percent to 55 percent of the new base price (which is the present applicable ceiling for "as-is" equipment) for each more recent year of manufacture beginning with the year 1939 until a new ceiling of 80 percent of the new base price is attained for machines manufactured in 1943.

The percentage pricing method is a third alternative method, designed to bring out a supply of used machines which the War Production Board indicated present owners would not sell at the former permissible maximum prices.

DON'T WASTE PAPER

Paper is a vital war material as well as a civilian requirement. As the supply diminishes the need for using it intelligently becomes more necessary. Be as careful with it as you can, using it only when unavoidable. And when it has served as many uses as possible, salvage it for other service. Speaking of paper, keep buying War Bonds.

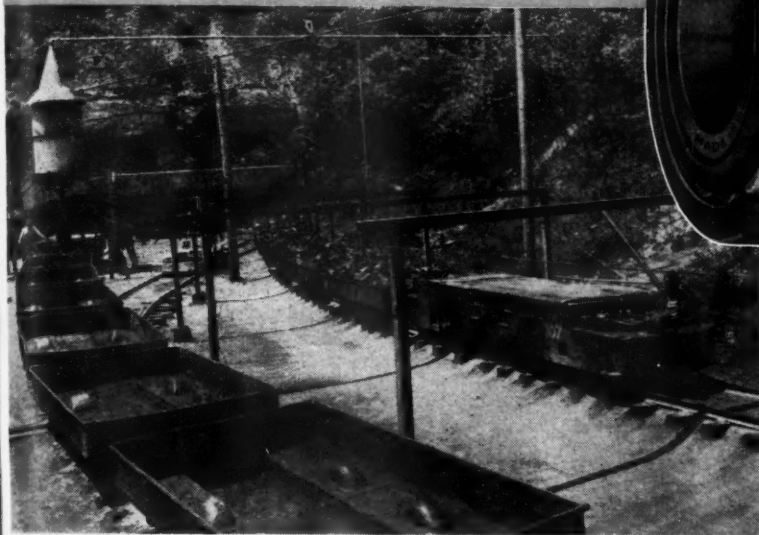
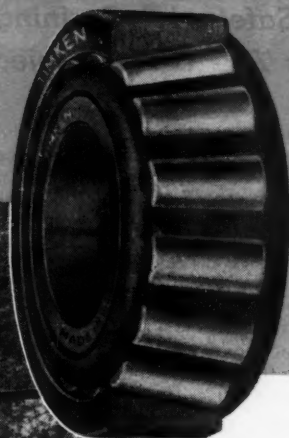
TIMKEN BEARING EQUIPPED MINE CARS

ARE "TOPS"

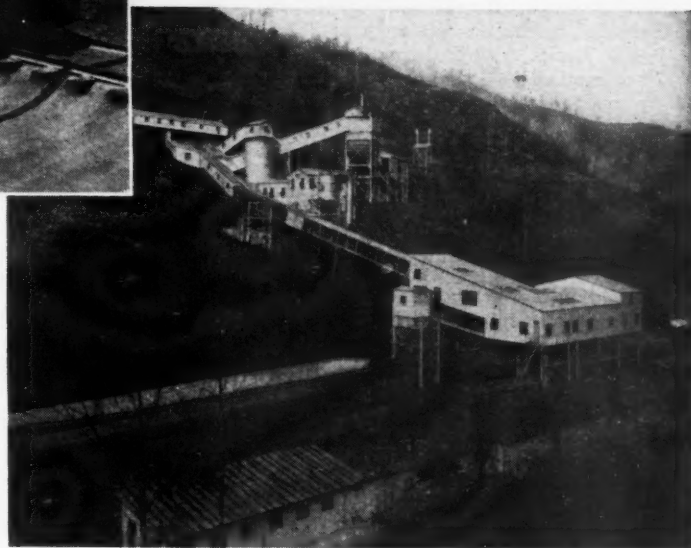
AT

INLAND STEEL Wheelwright Mine

Twin portals of the Inland Steel Company's mine, showing trip of loaded cars coming out and train of empties going in.



Surface plant, tippie and cleaning plant at the Inland Steel Company's mine.



There are 900 mine cars in service at the Inland Steel Company's coal mine, Wheelwright, Kentucky and practically all of them are equipped with Timken Tapered Roller Bearings.

In August, 1931, this operator purchased 525 cars, 500 of which were equipped with Timken Bearings and 25 with another make of bearing. Since that time 375 additional cars have been bought—all equipped with Timken Bearings.

Furthermore, the bearings in most of the 25 cars referred to above gradually have been replaced with Timken Bearings. Thus, with very few exceptions—possibly none by now—all the cars

in use at this mine, a total of 900, operate on Timken Bearings and are giving very satisfactory service. In this connection it will be noted, most of the cars have been in service for approximately 13 years. More than 1,000 mine operators have proved it pays to use Timken Bearing Equipped mine cars. Are you one of them? The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

Mine Inspectors Discuss Roof Control

Electrical Safety, Job Training Methods, Lessons to Be Gathered From Explosions Are Other Subjects at 35th Annual Meeting at Charleston

ROOF CONTROL by sealing strata from atmospheric effects is cheaper for a projected life of over five years than installation and maintenance of timbering in mines of the Hanna Coal Co., James Hyslop, vice president in charge of operations, told the Mine Inspectors' Institute of America at its 35th annual meeting at Charleston, W. Va. Nine miles of entry have been gunited and the cost range for a plain 1-in. coating is 19 to 25c. per sq. ft. Other papers included two more on roof control—by air conditioning and by painting, electrical safety, job training, and lessons from recent mine explosions.

Several records were broken at the June 5 and 6 meeting, the sixth to be held in West Virginia. Registration totalled 409 compared to the previous high of 288 in 1942. Ladies registered numbered 111. Two hundred eighteen members were at the meeting compared to the former record of 155. One hundred two new members were accepted. Secretary C. A. McDowell, director of industrial labor relations, Jones & Laughlin Steel Corporation, California, Pa., pointed out that at the first meeting held in West Virginia, in 1911 and the fourth meeting of the institute, 44 men were present.

Ladies were entertained by a tea at the Governor's mansion, by a trip to the Blenko glass plant at Milton followed by a luncheon. At the Blenko plant, where stained sheet glass and decorative glassware are made, each lady was presented with a bubble glass water pitcher. A sidelight of the institute meeting was a get-together of nine of the 23 men who in 1924 received gold watches for recovery work at the Benwood (W. Va.) explosion on April 28 of that year.

Nine Miles of Gunitite

The guniting experiences recited by Mr. Hyslop were based on mines in the Pittsburgh No. 8 seam in eastern Ohio. The "average" roof condition is 12 in. of weak drawslate, above that 0 to 24 in. of roof coal varying from strong to weak, next 5 to 8 ft. of shale, soapstone and clay and then the permanent roof consisting of a stratum of hard blue limestone. All material below the limestone disintegrates when exposed to air and moisture and the ribs scale. The guniting, now totaling nine miles of entry, was begun 10 years ago.

It is applied after all material up to the limestone has been shot down and removed and finally all loose material scaled from the coal, from the sides above and from the top of the arch. For a 10-ft. entry with a cross-section of 75 ft. the perimeter coated amounts to 25 to 30 ft. A complete guniting outfit costs about \$5,000. Use of four company men, who also do final scaling prior to the application, has resulted in a better job than with a contractor using six men.

The usual application of a 1-in. coating of gunitite not reinforced and installed on return air is applied in two coats consisting of one part cement and three parts sand of top size $\frac{1}{4}$ -in. with 50 per cent of $\frac{1}{4}$ x $\frac{1}{4}$ -in. material. Principal object of the first flash coat ($\frac{1}{4}$ in. thick) is to seal the surface as quickly as possible. Substation rooms, underground shops, air shafts and so on are coated 2 in. thick in three applications and reinforced between second and third coats with 4x4 No. 8 mesh wire

anchored by tie wires on 12-in. centers put in between first and second coats.

With this 2-in. reinforced guniting put on intakes outby the point where mine temperature and humidity are reached, Mr. Hyslop said his company has had little experience but he understands that some applications made several years ago are holding satisfactorily. Current contract prices, labor and materials, per square foot, for guniting are approximately as follows: plain 25c.; reinforced, 46c. Company

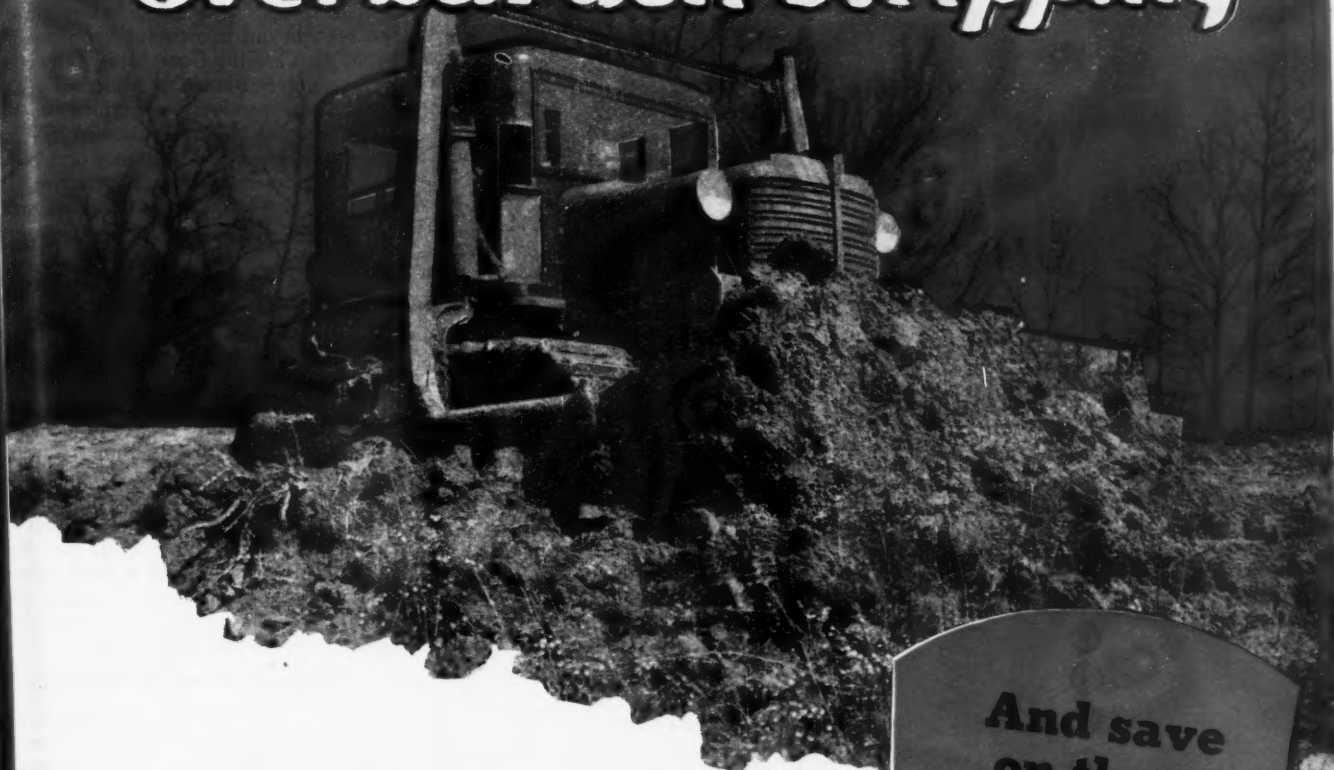


Some of the old and new officers and speakers of the Monday sessions (left to right)—Back row: R. D. Bradford, G. M. Patterson, O. H. Youngblood, Richard Maize, Clyde L. Lutton, Frank Hillman. Center row: Edward H. Denny, Patrick A. Grady, Lot H. Jenkins, Jesse Redyard. Front row: J. J. Forbes, J. A. Welch, Henry R. Owens, C. A. McDowell, J. J. Rutledge.



Frank Hillman of Alabama (foreground) installs the new officers (left to right): Lot H. Jenkins, J. J. Forbes, Richard Maize, J. J. Rutledge, Henry R. Owens, Clyde L. Lutton, Jesse Redyard, G. M. Patterson and C. A. McDowell.

Take the "burden" out of overburden stripping



with BAKER BULLDOZERS

This Baker Hydraulic Bulldozer is stripping overburden at the Knox Consolidated Coal Company's strip mine near Bicknell, Indiana. It is handling a generous load; a characteristic of this powerful bulldozer. Quickly converted to a Gradebuilder.

No matter what the nature of the overburden—even where there is plenty of tough shale and slate—Bakers take it right along. They do small stripping jobs single-handed and help electric shovels on the big stripping jobs, greatly lowering costs in both cases.

Stripping overburden has proved a "natural" for the Baker Bulldozer, with its direct lift and full hydraulic down pressure on the blade. In crowding, fully half the weight of the tractor can be exerted on the blade; it does not depend on the weight of the blade alone. This feature results in deeper cuts and bigger loads. Let us send Catalog 839 and give you priority data on Bulldozers and Gradebuilders.

THE BAKER MFG. CO.
514 Stanford Ave., Springfield, Ill.

**And save
on these
jobs, too!**

Excavating drain-
age sumps

Helping shovels
load

Building roads and
ramps

Leveling slack
piles

Scaling off bone

Pushing mired
trucks

Trap loading of
trucks and
cars, etc.

Used at more
than 100
strip mines!

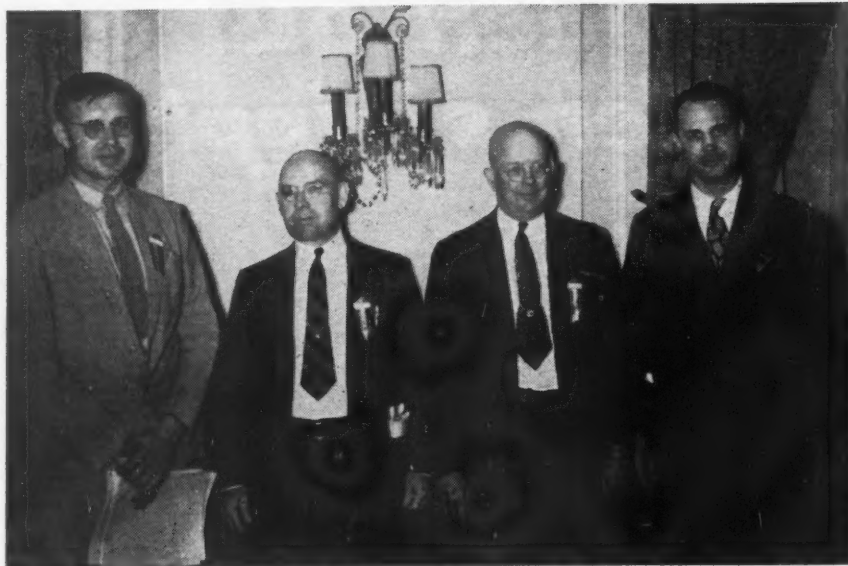
BULLDOZERS SNOW PLOWS

BAKER

CONSTRUCTION EQUIPMENT



at: Lot H.
L. Lutton.



Speakers at the Tuesday morning session (left to right): Franklin E. Griffith, George J. Steinheiser, C. C. Ballard, and L. H. Winger.

	Telephone
	Pump
	Motor Generator
	Rotary Converter
	Rectifier
	Transformer
	Sectionalizing Switch
	Inclosed Switch
	Battery Charging Station
	Hoisting Equipment
	Telephone or Signal Line
	Trolley Line
	Feeder Line
	Buried Circuit

Bureau of Mines symbols used on the electrical map of underground equipment and circuits exhibited by C. C. Ballard.

applications of the same types cost about 19c. and 34c.

Before an air cooling plant was installed at Beech Bottom mine of the Windsor Power House Coal Co., D. F. Welch, mining engineer, said summer month roof falls on haulage roads and other intake air-courses were a continuous trouble and expense. With the air cooling plant in operation during the four summer months of 1942 and 1943, falls due to summer atmospheric conditions on roads and intake airways were eliminated.

The plant, conditioning 90,000 cu.ft. of air per minute moved by an exhaust fan operating against 24-in. water gage, is at an air shaft having main intake and main

return compartments. This arrangement made it possible to use the return air to cool the water that was warmed by the intake air, a necessary device because of an inadequate water supply at the mine. Mr. Welch gave test data from continuous wet and dry bulb recording instruments made available by the U. S. Bureau of Mines, Pittsburgh.

Paint will eventually find a place as a relatively inexpensive means of controlling roof in conjunction with timbering, Frank G. Smith, general superintendent, Sunday Creek Coal Co., said in a paper based on his observations as a member of an American Mining Congress committee investigating recent jobs of roof painting. He

concluded: "It is not certain that roof painting is not a proved success, but, on the other hand, observation will prove that it is not a proved failure."

That room tracks will serve in most instances as a sufficiently low resistance contact to constitute a satisfactory ground was brought out in a comprehensive paper by F. E. Griffith, Coal Mine Inspection Division, U. S. Bureau of Mines. Twenty-three tests, previously described in the Bureau's report No. 3734, showed 15 room tracks to have ground resistance of 3 ohms or less, believed to be fully effective. In only one test was the resistance as great as 11 ohms and in that mine the room tracks were insulated from the main tracks by wooden blocks. Three measurements on these tracks showed resistances of 1.8, 7.5 and 11 ohms.

Mr. Griffith said that although effective grounding is not a cure-all for the many electrical hazards, it has a definite place in safety work and offers a means of reducing ignitions and shocks. Mining laws in Pennsylvania, Indiana, Ohio, Utah, North Carolina and Washington call for grounding. Grounding prevents accumulations of static charges which might ignite gas. Mr. Griffith demonstrated with a small gallery the explosions of mixtures of natural gas and air by static charges generated by wiping a quartz rod with a cloth.

Cables in Working Places

A paper, "Safe and Efficient Methods of Sectionalizing Cables in Working Places," by John F. Conrad, Pennsylvania electrical inspector, was read by Geo. J. Steinheiser, inspector, Uniontown. This paper dealt principally with the floor cables used in rooms worked with shaker and chain conveyors. The author believed sectionalizing these cables with plug connectors would eliminate many hazards.

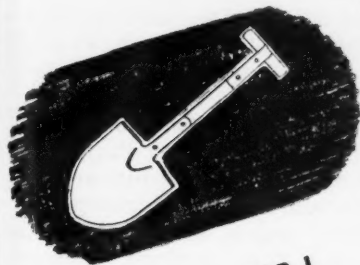
His reasons were: (1) large coils of cable eliminated, thus reducing amount exposed to heating and mechanical injury; and (2) number of temporary splices can be controlled because sections thus affected can be removed for permanent repairs. In gassy mines, however, use of open-type plug connectors might introduce hazards more serious than those eliminated. For those mines the connectors must be explosion tested, resistant to acid water, simple to operate and secure, built to accommodate three conductors, made streamlined shape to prevent catching, without removable parts which might be lost during connecting, of minimum weight and designed to accommodate concentric and other types of cables.

Circuits and apparatus designated by symbols and the electrical map made in one color on tracing paper which can be blueprinted or laid over the mine map to indicate exact locations of the wiring and various items of equipment were described by C. C. Ballard, master mechanic, New River Co. He exhibited an electrical map made on the same scale as a mine map—1 in. equal 300 ft.

He uses the symbols recommended by the Bureau of Mines Circular Letter No. 620 but said there is need for a separate symbol for the automatic reclosing circuit breaker as contrasted to an "inclosed

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Shovels save lives

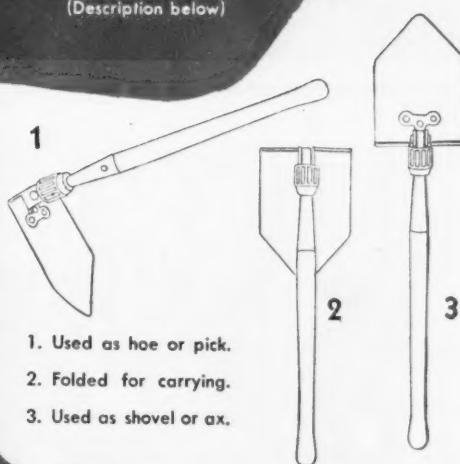


IN WORLD WAR I
... of the entire 1,800,000
Entrenching Shovels made for the
U. S. Armed Forces, WOOD alone
made 1,250,000.



In World War II, WOOD
has already made hun-
dreds of thousands of
the new 1943 Entrench-
ing Shovels as shown.
(Description below)

WAR WON'T WAIT! Urgent war demands have required us to vastly increase our output . . . We've already produced immense quantities of both regular style and Entrenching Shovels for the Armed Forces . . . This is why we have been able to supply only a bare minimum for home-front use—in spite of our sympathetic realization of the needs of our trade . . . But after the war, all our famous brands will be back—in unlimited quantities—in *finer-than-ever* quality developed in our intensive war production.



1. Used as hoe or pick.
2. Folded for carrying.
3. Used as shovel or ax.

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BUY WAR BONDS

and Back the Attack!

FIGHT INFLATION

and Safeguard the Home Front!

SAVE SCRAP METAL

and Keep War Production Rolling!

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**The WOOD SHOVEL
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PIQUA, OHIO

A NATIONAL ORGANIZATION SPECIALIZING IN SHOVELS, SPADES AND SCOOPS

switch". Mr. Ballard characterized the automatic breaker as "an important apparatus on an underground circuit since it will open the circuit in case of failure caused by falls, burned-out motors, short-circuited cables and other causes and it will remain open until the cause of the failure is removed and may prevent fires and other hazardous conditions in the mine."

Mr. Ballard exhibited a table of electrical data for four mines (shaft, slope and drift) of tonnage range from 37,000 to 52,000 per month and using 6.33 to 11.93 kw.-hr. per ton. Load factors range between 45 and 59 percent. Power consumptions are segregated for substations, hoist, fan, tippie, town lights, a.c. pumps, and a.c. power. He also included a graph

of kilovolt-ampere demands for 24 hours for a mine which has a 2,200-kva. average demand. A low of 750 kva. is hit at 4 a.m. and the high period between 2 p.m. and 11 p.m. runs around 2,800 kva.

In discussion of the paper Richard Maize, Secretary of Mines, Pennsylvania, said his State is the only one which requires a separate electrical map.

L. H. Winger, supervisor of employment and training, Island Creek Coal Co., declared final success of mechanical mining depends on cooperation and coordination of each employee to obtain the greatest efficiency from equipment and men taking into consideration safety, production and cost. Plant surveys and job analyses by Island Creek established the need for three different types of training: pre-



Two of the several speakers at the last session. James Hyslop (left) and Thomas Moses.



Attending the Charleston meeting were these eight men who worked at the Benwood explosion in 1924 (left to right)—Back row: Edward H. Denny, R. M. Lambie, Robert Lillie, Lot H. Jenkins. Front: W. J. Fene, William H. Forbes, D. M. Ryan and George Groves. (Also present but not in the photograph was William Moore).

NEW OFFICERS

Henry R. Owens, Truckville, Pa., succeeded Patrick A. Grady, Allock, Ky., as president. Other new officers are: first vice president, Clyde L. Lutton, Pittsburgh; second vice president, G. M. Patterson, Lexington, Ky.; third vice president, Jesse Redyard, Charleston; secretary, C. A. McDowell, California, Pa.; assistant secretary, J. J. Forbes, Washington, D. C.; treasurer, J. J. Rutledge, Baltimore; editor-in-chief, James W. Paul, Pittsburgh; assistant editor-in-chief, Richard Maize, Uniontown; publicity editor, R. Dawson Hall, New York; assistant publicity editor, Lot H. Jenkins, Martins Ferry, Ohio.

employment, apprentice and supervisory.

The State Mining and Vocational School was selected for pre-employment. Apprentice training is furnished by the same school in cooperation with the company's own apprentice plan. Material for supervisory training comes from the Mining Extension Department. Training Within Industry, Division of WMC, foremen's conferences, personnel leadership, charts and sound films.

A County Vocational Mining School which the Logan coal companies asked the local school authorities to organize has been in operation for four months, thus making use of federal and state funds.

Adjoining the school building is a wooden tunnel 10x10½ ft. and 150 ft. long with a roof adjustable down by 6-in. steps to simulate a 42-in. coal seam. Capacity of the school is 250 students and the present enrollment is 150. The coal company sponsors student tours through mining properties and hires all physically fit graduates, who are prorated among the interested companies.

"One of our most critical handicaps today," said Mr. Winger, "is the lack of tactful and intelligent handling of men." Job instructor's training, job methods training and job relations training courses are given to supervisors. One course each year is given to the entire organization by the company's own ten instructors, who have attended a teachers' training institute of the Training Within Industry Service.

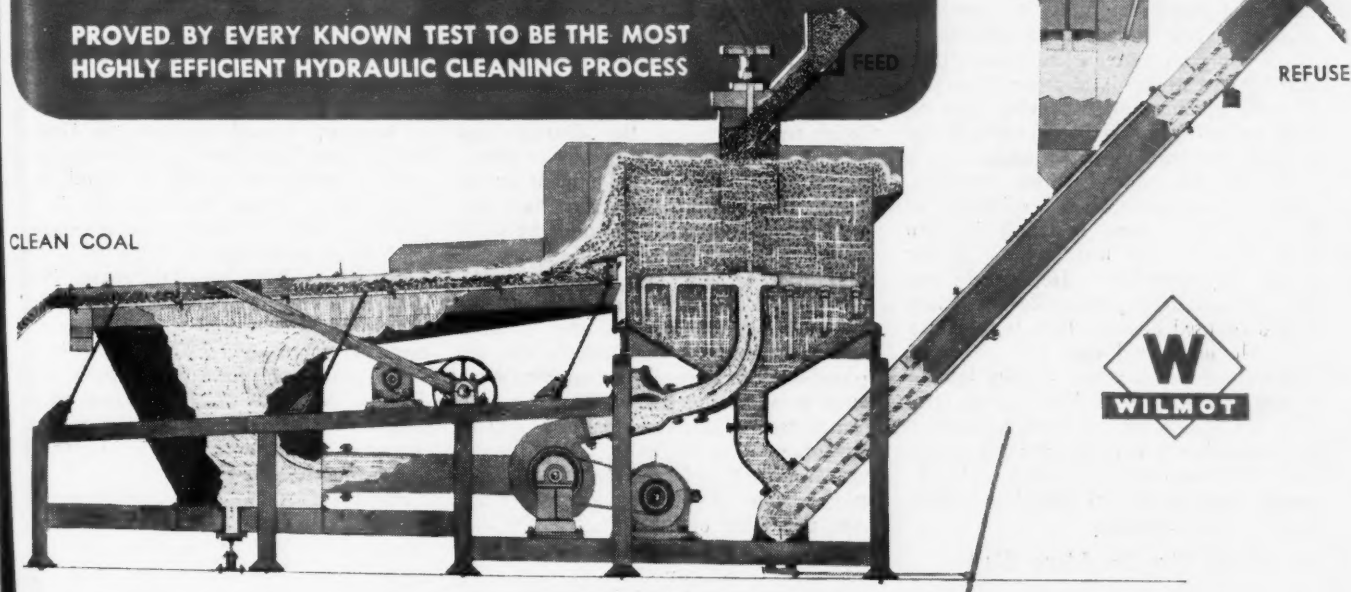
Lessons From Explosions

Men from four states read papers describing disasters. Jesse Redyard, chief, West Virginia Department of Mines, said there was a lack of caution in the Nellis No. 3 mine explosion Nov. 6, 1943. He emphasized that special care should be given to selection of assistants to the mine foreman. His paper reviewed the details of the explosion, in which 11 men died due to cutting into an abandoned section.

Worked-out unventilated sections of bituminous coal mines will accumulate

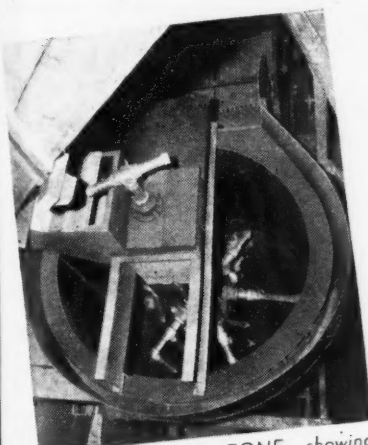
★ **THIS** IS THE UNIT
THAT SPEEDS-UP PREPARATION
WITHOUT SACRIFICING QUALITY

PROVED BY EVERY KNOWN TEST TO BE THE MOST
HIGHLY EFFICIENT HYDRAULIC CLEANING PROCESS

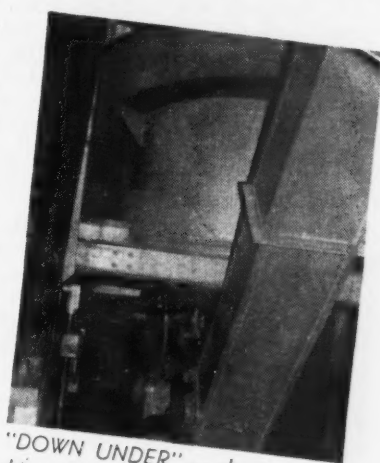


★ ★ **THE WILMOT HYDROTATOR**

Exclusive mechanical features give the Hydrotator definite advantages in:
(1) capacity for handling larger tonnages;
(2) ease of operation; (3) lower power cost; (4) minimum operating, maintenance, and repair cost. Efficiency, compactness, simplicity and capacity are all-important in coal cleaning processes, and Wilmot Hydrotators combine all four . . . plus increased speed and automatic control, stepping-up output without sacrificing cleaning efficiency.



LOOKING INTO CONE, showing
rotating agitator, and raw coal feed box.



"DOWN UNDER" - - showing pump
drive, screen drive, refuse conveyor.

★ **WILMOT BUILDS BETTER BREAKERS**



WILMOT ENGINEERING CO., Foundry and Shops: **WHITE HAVEN, PA. HAZLETON, PA.**

methane even though the mine has in the past been free of gas, according to G. M. Patterson, chief mine inspector, Kentucky. This, he said, was the principal lesson taught by the explosion at Three Point mine where 12 men were killed. From the circumstances of the explosion Mr. Patterson concluded: "There is nothing more dangerous than a flame safety lamp in the hands of a man who does not know how to handle one."

Of six men rescued uninjured from behind a barricade 2,900 ft. in by the explosion, two had just completed the U. S. Bureau's training in mine rescue, which Mr. Patterson said proved the value of such training and of having men on each section who had been taught in the location and building of barricades.

O. H. Youngblood, mine inspector, Alabama, described two explosions at Sayreton No. 2 mine in which 15 men were killed in the first and 11 in the second 2½ hours later. He brought out these lessons: only permissible equipment should be used in other than fresh intake air, with anticipated roof falls or actual roof subsidence all power circuits leading to that area should be de-energized; after a normal flow of air has been interrupted no change should be made until a thorough search has been made for fire, and self-rescuers can save miners caught in certain situations by explosions.

Blame Map for Mine Blast

An error of 140 ft. in the mine map was the primary cause of a disaster May 5, 1943, at the Nu-Rex mine, Lafollette, Tenn., according to J. A. Welch, chief inspector, who read a brief paper describing the explosion. Eighteen men were rescued uninjured after 7 hours behind a barricade. In this mine, most of which has been abandoned, a drainage connection was being made from the active area to the old workings. The pillar was supposed to be 240 ft. but at about 100 ft. the non-permissible machine cut through and ignited the gas.

Prospects for a good record this year were foretold in data recited by Edward H. Denny, chief, Coal Mine Inspection Bureau, U. S. Bureau of Mines, Pittsburgh. From January to April, 1943, 558 lives were lost, while this year the total to date is 379. Last year the rate per fatality was 2½ millions of tons and this year to date it is 1.63.

Commenting on the Nellis disaster, Mr. Denny pointed out that dust must be raised by a blast, fall or other circumstance before it can explode and therefore mines should be designed and operated to prevent dust clouds. He said he knew of other cases where gases from abandoned areas extinguished safety lamps but when those gases were mixed with air they became explosive. It takes some time to clear a safety lamp of bad air so it can be relighted.

From the Three Point explosion he deduced it should always be assumed an abandoned area contains methane. He believed men should be trained in the use of their self-rescuers and that in some of the self-rescuers made many years ago the rubber parts might have deteriorated.

Of attempts to dismantle and relight flame safety lamps in the mine, Mr. Maize said he issued an order that only magnetically locked safety lamps may be used in Pennsylvania mines.

R. D. Bradford, district inspector, Oklahoma, highlighted the value of mine-rescue training by telling of a rescue-trained greaser who after an explosion saved a number of men by building a barricade. The greaser had recently come from another mine and was the only one on the section so trained.

The practical experience, technical study or training and community knowledge of the local State mine inspector makes him a competent adviser to the operators, especially newcomers in the district, said Thomas Allen, executive director of mines, Colorado. Because a safe mine is an efficient mine, most inspectors have expanded their viewpoints beyond the plain enforcement of mining laws.

"Providing safety in coal mines," said Thomas Moses, chairman, reporting on activities of a committee of the National Safety Council, "is undoubtedly the responsibility of the employer, commonly referred to as the operator." The National Committee to Conserve Manpower by the Prevention of Accidents in Coal Mining, organized less than a year ago to assist law-enforcing officials of the industry, represents the mine owners, the U.M.W.A., state mining departments, Bureau of Mines and district mine inspectors.

"This is the first time," Mr. Moses said, "the industry has been offered a plan that brings all factors within it into the conference room with only one objective—

safety." Procedure has been to have each state department of mines form a state-wide committee and for inspectors to form local district committees.

Walter Polakov, consulting engineer, representing the U.M.W.A. on the committee, pledged unreserved support to the movement "for 100-percent safety" for miners at work and in their homes. He also spoke for labor-management safety committees.

Mine Fatalities Descend Sharply

Accidents at coal mines of the United States caused the deaths of 64 bituminous and 4 anthracite miners in April last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 49,600,000 net tons, the accident-death rate among bituminous miners in April last was 1.29 per million tons, compared with 1.82 in the preceding month and 2.07 in April, 1943.

The anthracite fatality rate from accidents in April last was 0.77, based on an output of 5,202,000 tons, against 1.82 in the preceding month and 3.20 in the fourth month of 1943.

For the two industries combined, the accident fatality rate in April last was 1.24, compared with 1.85 in the preceding month and 2.18 in April a year earlier.

Fatalities during April last, by causes and states, as well as comparable rates for the first four months of 1943 and 1944, were as follows:

U. S. COAL-MINE FATALITIES IN APRIL, 1944, BY CAUSES AND STATES

State	Underground							Open-Cut	Surface	Grand Total
	Falls of Roof	Falls of Face	Haulage	Explosives	Electricity	Machinery	Other Causes			
Alabama.....	1	..	3	..	..	..	1	..	..	5
Illinois.....	5	..	..	..	..	..	5	..	..	10
Iowa.....	..	1	..	..	..	..	1	..	..	2
Kansas.....	..	..	..	..	..	..	..	1	..	1
Kentucky.....	3	..	2	..	..	..	5	..	..	10
Ohio.....	4	..	1	..	1	..	6	..	..	12
Penna. (bit.).....	6	..	3	..	1	1	11	1	..	23
Utah.....	3	..	..	..	..	..	3	..	..	6
Virginia.....	3	..	1	..	..	..	4	..	1	9
West Virginia.....	6	..	9	..	1	1	17	1	2	28
Wyoming.....	1	..	..	..	..	..	1	..	..	2
Total bituminous.....	32	1	19	..	3	2	58	3	3	118
Pennsylvania (anth.).....	3	..	..	1	..	..	4	..	..	8
Grand total.....	35	1	19	1	3	2	62	3	3	126

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*

Cause	January-April, 1943 and 1944								Total			
	Bituminous				Anthracite				Total			
	Number Killed	Killed per Million	Tons		Number Killed	Killed per Million	Tons		Number Killed	Killed per Million	Tons	
Underground:	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944
Falls of roof and coal...	227	175	1.122	0.831	30	30	1.446	1.384	257	205	1.152	0.883
Haulage.....	87	74	.430	.352	15	9	.723	.415	102	83	.457	.358
Gas or dust explosions:												
Local.....	12	..	.059	..	..	1	..	.046	12	1	.054	.004
Major.....	74	18	.366	.086	..	..	..	..	74	18	.332	.078
Explosives.....	16	4	.079	.019	3	8	.144	.369	19	12	.085	.062
Electricity.....	10	11	.049	.052	..	..	..	..	10	11	.045	.047
Machinery.....	9	9	.044	.042	..	..	..	..	9	9	.040	.039
Shaft.....	4	2	.020	.010	..	..	..	..	4	2	.018	.008
Miscellaneous.....	16	4	.079	.019	7	3	.337	.138	23	7	.103	.030
Stripping or open-cut.....	14	8	.069	.038	3	2	.144	.092	17	10	.076	.043
Surface.....	23	15	.114	.071	8	6	.386	.277	31	21	.139	.091
Total.....	492	320	2.431	1.520	66	59	3.180	2.721	558	379	2.501	1.633

* All figures subject to revision.

HOMO-FLEX HOSE

10

10 ADVANTAGES

- 1—Extreme flexibility—easy to handle
- 2—Resists kinking
- 3—Light in weight
- 4—Practically inseparable cover and plies—balanced homogeneous construction
- 5—Withstands high pressures and surges with wide margin of safety
- 6—Uniform inside diameter
- 7—Less elongation and expansion
- 8—Less fatigue to operator
- 9—More production
- 10—Lower ultimate cost

—a MANHATTAN Development brings you 10 advantages important in war or peace

IN WAR—The homogeneous and extremely flexible construction achieved by MANHATTAN Strength Members of super-strength cords and the balanced, engineered method by which they are applied and inseparably combined with the FLEXLASTICS* tube and cover, together give a service impossible a few short years ago.

Every one of these advantages contributes to greater production through less fatigue to operator and to much longer hose life—therefore fewer interruptions.

Still another MANHATTAN advantage—Turnate Vulcanization—imparts added strength to Homo-Flex Hose. This process applies pressure progressively before and during vulcanization to give not only uniform inside and outside diameters, but

also uniform texture and resilient strength. The distinctive spiral marking identifies Turnate Vulcanization.

IN PEACE—All these advantages will have cumulative value for you in the forthcoming competitive period. Then the multiple economies of long service life; resistance to high working pressures and surges; easy handling with less operator fatigue because of its light weight; toughness to withstand wear, abrasion and kinking; will help keep costs down and profits up.

Manhattan's Condor Brand Homo-Flex Hose is or will be available in types for the following services: Air, Water, Steam Pressing Iron, Orchard Spray, High Pressure Mine Spray, High Pressure Oil Spray.

Buy more BONDS to bring the boys down the home stretch

* The term FLEXLASTICS is an exclusive MANHATTAN trade mark. Only MANHATTAN can make FLEXLASTICS.



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Executive Offices
Passaic, New Jersey

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Surface	122	0.000	Grand Total
1	20	1	
2	64	4	
3	68		

IDENTS'

Killed per million Tons	1943	1944
.152	0.883	
.457	.358	
.054	.004	
.332	.075	
.085	.052	
.045	.047	
.040	.039	
.018	.008	
.103	.030	
.076	.043	
.139	.091	
.501	1.633	

DAL AGE

Better Mining Theme of Denver Meet

Legislation, Mining With Conveyors and Loaders, Federal Inspection, Preparation, Priorities and Ventilation Feature 41st Rocky Mountain Meeting

MAKING COAL mining more efficient shared honors with legislation, federal mine inspection, preparation, priorities, underground fans and research at the 41st regular meeting of the Rocky Mountain Coal Mining Institute, Cosmopolitan Hotel, Denver, Colo., June 8-10. Five technical and business sessions were presided over by D. H. Pape, president, and C. M. Shott, vice president, Sheridan-Wyoming Coal Co., Monarch, Wyo.; George H. Rupp, manager, mining department, Colorado Fuel & Iron Corp., Pueblo, Colo.; and R. C. Oliver, president, Oliver Coal Co., Somerset, Colo.

Declaring that federal powers no longer were restricted to their primary objective—creation of the proper climate for individual enterprise—Robert S. Palmer, secretary, Colorado Mining Association, Denver, Colo., expressed the opinion that coal and metal mining have a mutual problem in preventing further encroachments on freedom of action which would stifle initiative and reduce the ability of these and other industries to serve the public.

The powers taken over by the Federal Government should be returned to the States, Mr. Palmer asserted, and thus make it easier to cope with the problems that must be solved. The mining industries must keep track of candidates for office and of legislation. Legislative problems are confronting the industry now and cannot be sidestepped. Prompt, firm dealing with the problems presented must be the rule, said Mr. Palmer, and metal and coal must take their case to the people. And, finally, industry must work to achieve true cooperation with its employees so that mutual interests may be fostered and not destroyed by continuing conflict.

Proposed bituminous coal legislation, said Mr. Pape in discussion, should be held over until after the war in the opinion of many, since it is not necessary now. After the war, western operators should cooperate in action designed to assure its having the best possible features. Mr. Pape also supported the Fernandez resolution which would revise the basis of return of mineral royalties to the States and thus help the western area defray the cost of added service to its citizens. And while strongly objecting to the way the last bituminous wage agreement was drawn, Mr. Pape declared that it had accomplished at least one good objective—negotiation on an industry-wide rather than a regional basis.

Pointing out that the mercury-arc rectifier is an electronic device that is by no means new (the first was installed in the anthracite region in 1926), William H. Mott, mining division, General Electric Co., Schenectady, N. Y., in discussing its use for dependable underground power, declared that rectifier installations in all

industries to date total nearly 4,000,000 kw. Rectifier use, he stated, has expanded materially in the past three years because "it was recognized that this reliable, more efficient unit used considerably less critical materials than the standard rotating conversion equipment," as well as because of concentration of facilities for building m.g. sets on military work.

Detailing the features of both the "pumped ignitron" and "sealed ignitron" rectifiers, Mr. Mott discussed at length "sealed ignitron" units for coal mining. To reduce voltage drop, additional conductor capacity can be installed or the conversion equipment can be kept as close to the face as necessary. The problem of keeping conversion units close, he stated, can be solved best by "portable sealed ignitron rectifier equipment," which is mounted on wheels and requires no special foundation, and thus can be moved at will and put into service simply by connecting three a.c. and two d.c. power leads.

Advantages of the portable sealed ignitron rectifier were listed by Mr. Mott as follows: (1) high service availability from the standpoint of ability to withstand overloads, immediate availability of power, ability to operate at reduced load in case of one ignitron failure, and freedom from mechanical troubles; (2) greater safety through elimination of rotating apparatus and greater electrical protection; (3) ease of installation; (4) full automatic operation; (5) comparable initial cost; (6) minimum critical materials in construction; (7) low operating cost; (8) favorable power factor which may, if necessary, be increased simply by adding static capacitors; (9) adaptability to any desired type of voltage regulation; and (10) low maintenance because of absence of rotating parts.

"To sum up the comments on these rectifier equipments," said Mr. Mott, "it can be recognized that the mercury-arc rectifier has certain characteristics that make it ideal for mining conversion equipment. It is by no means the answer to all conversion problems, but it certainly is a big step toward the long-felt desire of the mining industry for a static conversion unit that would be simple in construction and reliable and efficient in operation. The growing number of installations and the fact that many coal mines have standardized on this type of conversion equipment attest its success as an improved type of apparatus for dependable power conversion in mines."

In requesting rectifier equipment, H. G. Dillon, Westinghouse Electric Mfg. Co., urged that mines accept, wherever possible, the standard units available and thus assure lowest price and best delivery.

Mining with shaker conveyors in the 9-ft. Wadge seam, pitching 18 to 20 percent at Harris mine, was detailed by J. B. Burns, assistant superintendent, The Colorado & Utah Coal Co., Mt. Harris, Colo. Installation of shakers started in 1938 and the operation now is 100 percent on this equipment after an initial period in extracting old pillars.

Slopes are driven directly up the pitch for turning level entries 350 ft. apart, from which rooms are worked up the pitch. Entries are driven by two shaker units with common loading points on the lower, or haulage, openings. Room necks are made in the entry chain pillars on 50-ft. centers as the openings advance, but only every sixth one is driven completely through for new loading points every 300 ft. Rooms are driven and pillars are mined on the retreat. In level entry operation, two men work at the face in each heading, with one loader-headman for both. Openings are kept 100 ft. ahead of each new loading station to

R.M.C. OFFICERS

D. H. Pape, president, Sheridan-Wyoming Coal Co., Monarch, Wyo., was chosen president of the Rocky Mountain Coal Mining Institute at the Denver meeting. He succeeds Gomer Reese, general superintendent, Moffat Coal Co., Oak Creek, Colo.

Fred W. Whiteside, consulting engineer, Denver, was re-elected secretary-treasurer. Other officials were chosen as follows:

Vice Presidents: Colorado—J. B. Burns, assistant superintendent, The Colorado & Utah Coal Co.; Utah—Terry McGowan, McGowan Coal Co.; Wyoming—Louis La Salle, superintendent, Colony Coal Co.; New Mexico—G. O. Arnold, manager, Phelps Dodge Corp.

Executive Board: Colorado—William Andrew, Boulder Valley Coal Co., Finlay McCollum, State mine inspector; Wyoming—Urban F. Toucher and I. M. Charles, Union Pacific Coal Co.; Utah—B. W. Dyer, U. S. Geological Survey; James Thorpe, Utah Fuel Co.; New Mexico—J. R. Barber, St. Louis, Rocky Mountain & Pacific Co.; Clarence E. Uland, Gallup-American Coal Co.

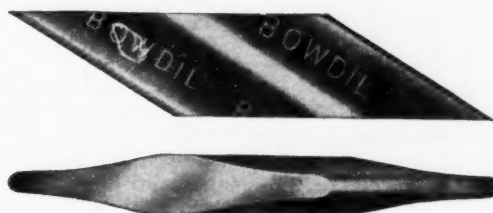
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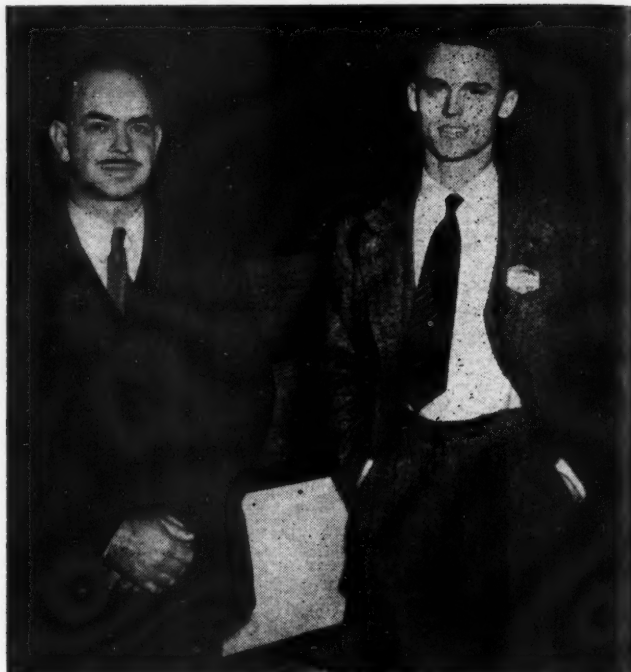
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Fred W. Whiteside, reelected secretary-treasurer (left), with D. H. Pape, new institute president.



Ronald C. Oliver, Oliver Coal Co. (left), and R. G. Heers, Kaiser Co., Inc.

permit setting up the duckbill for each new advance in the lower heading.

In making the 300-ft. moves, the mining machines, fitted with ropes of sufficient length, are employed. Every precaution is taken to prevent loss of bolts, chains and other auxiliaries. A rule prohibits putting anything on the pan lines but coal. Partings are kept within 1,000 ft. of operating conveyors. Mine cars average 4.74 tons mechanically loaded.

Rooms are driven 25 ft. wide directly up the pitch, said Mr. Burns, leaving "a 25-ft. pillar which is extracted as soon as the room has been driven through to the entry above. In driving these rooms, their advance is offset so that the inside room is sufficiently in advance of the outside room that there is no difficulty experienced in pillar caves through pillar extraction."

Four-man crews, including loader-headman, are used in room-and-pillar work. The three foremen do everything but advance tubing and sprinkling lines. Supplies and materials are delivered to the face by men employed for that purpose. Because of the possibility of bumps, particularly during cutting, places are completely cleaned up before cutting is done. At least two sprags must be set against the overhanging face during cutting and, because of the possibility of bumps, bug-dusting is not permitted.

Four rows of props on 6½-ft. centers, plus another row of rib timbers on the tight side, are set in rooms. After a room is driven up, the pillars are removed by "taking about 40-ft. skips from the pillar, which is cut off at a 60-deg. angle," using two 30-deg. swivels.

"In the electrical set-up, each conveyor has a switch to which the main line is connected. This switch cuts all of the power off all the equipment with the

exception of the blower fan. These fans are set back 25 ft. on the intake side to prevent any recirculation of the air and are connected to the main line. They are not stopped by pulling the master switch. The master switch is set on a steel screw jack connected to the roof and floor. This acts as a ground but there also is a ground wire from this post to the rail and water sprinkling line. The electrical connections from the master switch to the different units are through connecting plugs that can be pulled when the equipment is being moved. The shaker units and fans are separately grounded to the rail and pipeline. No electrical lines are run in past the cross-drive crosscut in entries or up into the rooms, except the rubber-covered machine cables which we keep at 400-ft. lengths. A rubber connecting plug at the mining machine serves as a connection for the electric drill."

A standard drilling and shooting pattern is employed and no deviations are permitted. Special provisions govern handling and use of explosives (1½x8-in. permissible). Water is used on the cutter bars and places are sprinkled at intervals during loading and before shooting. All the workings except rooms are rock-dusted, and goggles, safety hats and safety shoes have been compulsory since 1933. Individual first-aid kits were introduced in 1942.

Life of a room and pillar, said Mr. Burns, is about one month, double shift with steady working time. He summarized results of the system as follows: "First, it has assisted us in improving our safety record; second, it has made it possible to extract a much greater percentage of coal than under previous methods; third, we have been able to do this at a lower operating cost."

Production from room units with four-

man crews averages 100 tons per shift in room work and 80 tons in pillar work, said Mr. Burns in discussion. Considerable study was given to the question of crew size, said H. C. Marchant, assistant to the president, The Colorado & Utah Coal Co., Denver. Work started with five men, but it was found safer to reduce crew size and tonnage. By adding another man, were it not for safety considerations, tonnage per unit could be increased, but not tons per man-shift. Recovery, said Kirk V. Cammack, U. S. Geological Survey, Fairplay, Colo., was running better than 90 percent at Harris mine.

"You can't mine it like dad did and haul it 28 miles to rail," was theme of a paper on mechanical mining at his property in Moffat County, Colorado, by George C. Watson, Denver. "That same 28 miles calls for production of the order of 15 tons per man to be profitable," in addition to good trucks, good drivers and intestinal fortitude, Mr. Watson stated. When operations started at Streeter mine (Coal Age, September, 1941) they had to contend with a difficult shooting problem, plus 35 cracker-box 36-in. gage cars holding 2,500 lb. machine loaded and which had to be rebuilt every three months. "So it became obvious that 15 tons per man could not be obtained with shakers and cracker boxes." The result was the purchase of two used 5 BU's, which loaded a cracker box in 30 seconds, after which it took 6 minutes to get another car under the machine.

Concluding that it was not the front but the back end of the loader that counted, a search for a better method of hauling the coal resulted in "the famous 'home-brew' shuttle cars," made of dump trucks. These brought the tonnage up to 17.86 per man-shift, all men employed, in January, 1941. A unique trolley system

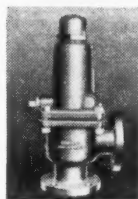
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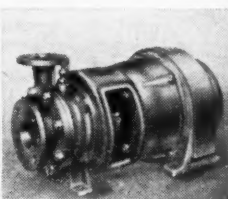
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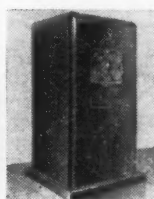
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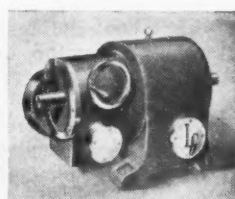
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was devised to power the cars. At that time these were the largest shuttle cars (7 tons), were three of five such cars in existence, were the only ones trolley-operated and were the only ones running from the face to the tippie. They still are the last.

These buggies, with the help of John Russell, of Joy, and C. L. Benham and Edward Shipley, of the mine staff, were credited by Mr. Watson with furnishing the cash for two Joy 60E (11-ton) cable-reel shuttle cars, a new Joy loader and a new Jeffrey 29 UC cat-mounted cutter

separated by intervals of 70 to 170 ft. The seams are classified as clean, said Mr. Livingston, and pitch about 21 percent, or 12 deg.

The pioneer set of the tunnel portal was installed early in January, 1943. This 8x12-ft. opening was driven level across the coal seams. The first workable seam was intersected at 2,300 ft., the next at 3,050 ft. and a third at 3,800 ft. The tunnel was ventilated during construction by 22-in. drillholes and blower fans on approximately 700-ft. centers.

An unusual burned condition forced

armored cable at 2,300 volts. Main hoists and pumps operate on that voltage, with all other equipment by 250-volt, d.c. inclosed-type motors. A.c.-d.c. conversion is handled by portable Ignitron rectifiers, which were chosen over the m.g. sets used in the past because of greater efficiency at both high and low loads, elimination of rotating parts, full automatic controls on both the a.c. and d.c. sides and ease of installation and moving.

Main slope hoists have been designed for an ultimate load of 25,000 lb. and a capacity of 7,000 ft. of 1½-in. rope, 1,500 f.p.m. at full load. Shaker units are accompanied by shortwalls with 8½-ft. bars, hand-held or post drills, hand tools, blower fans and necessary blasting and signal cables, in addition to duckbills, swivels, angle troughs and attachments. All gathering locomotives are 8-ton with full dynamic braking and gearless reels; haulage locomotives are 15-ton with dynamic and hand braking.

A modern surface dumping station and three-track concrete and steel railroad-fuel tippie serves the property. Capacity of the plant is 500 tons per hour loading 1-in. slack, 1x3-in. nut, 3x6-in. egg and 6-in. lump. Picking, crushing, mixing and tramp-iron-removal facilities are installed. The plant also is designed for stoker or box-car loading additions in the future.

Other surface facilities include a 44x128-ft. bathhouse, 52x100-ft. shop, 40x80-ft. warehouse, office building, store building and recreation hall, community building, primary school, boarding house for single men and 60 houses for mine officials and supervisors, plus a water-supply system.

"Stansbury mine has been on a production basis since Jan. 1, 1944, and is going through the rather difficult period of transition from a construction project to a production plant," said Mr. Livingston in conclusion. "The daily production at the present time is 1,500 tons and could easily be increased to 2,000 to 2,500 tons by employment of necessary labor to fill loading units on both shifts. The labor personnel in this district has not been transferred or augmented to any degree from any of our other districts, and it has been extremely hard to recruit or otherwise acquire the necessary labor for this operation."

"The ultimate production of 5,000 tons daily can be reached during the next two-year period contingent, of course, upon a sufficient supply of the necessary labor. Production from the Stansbury mine will greatly relieve the critical shortage and gradual decline in production from some of the older mines. The task of opening during a war period has not been a simple one; however, we have been favored by better than average delivery of materials, fair wartime construction, labor supply and favorable weather during the construction period."

Maximum recovery should be the rule in coal mining, declared R. C. Oliver, president, Oliver Coal Co., Somerset, Colo., in a discussion of experiments in mechanical pillar mining. In his own operation, said Mr. Oliver, they had the impression they were doing a good job until they began working out sections that



John L. G. Weysser, WPB Mining Division, and Robert S. Palmer, secretary, Colorado Mining Association.

which will serve a new operation across the gulch.

Increased efficiency in mining, which the proper use of the machine does so much to bring about, is necessary now to help coal meet vital war requirements and will be even more so in the future when lower cost will be a major factor in coal's ability to expand its markets, said Ivan A. Given, editor, *Coal Age*, in discussion. Attaining low cost with quality and safety requires money, ingenuity and hard work, but will pay handsome dividends now and in the future.

Describing the new Stansbury mine, H. C. Livingston, general superintendent, Union Pacific Coal Co., Rock Springs, Wyo., in a paper read by George A. Brown, superintendent, Superior "D" and D. O. Clark mines, declared that preliminary development was completed during January, 1944, "marking the first milestone in the life of the 5,000-ton-daily-capacity operation named in honor of the distinguished army officer and explorer, Capt. Howard Stansbury, who recorded the location of the Rock Springs coal series during the year 1850."

Stansbury was opened to meet additional locomotive-fuel demands and also to augment the declining production of the old mines in the Rock Springs and Winton districts. Some 16,800 ft. of diamond drilling during 1942 and the spring of 1943 has indicated a workable reserve of approximately 35,000,000 tons in six seams, varying from 5 to 17 ft. in thickness and

some changes in the working plan, making it mandatory to work the upper seams in sequence before mining those immediately below. Slopes consisting of four places are driven on the true pitch. Slope and manway are driven downhill with track-mounted top cutters and Joy BU loaders; also main cross-haul entries. Aircourses are driven to the rise with shaker conveyors and shortwalls. Development to date will furnish working places for 21 shaker and 3 Joy loading units.

"The extent of workable area in each seam is approximately one mile to the north and one mile to the south of the main slope location as measured on the strike line and to the dip to the economic limit determined by the amount of cover, which is approximately 1,600 to 2,000 ft. in the Rock Springs field." Retreat mining will be done with sub-slopes paralleling the main slope at intervals of approximately 3,000 ft. and entries turned at 300- to 350-ft. intervals. Entries will be driven to their limits by pairs of shaker conveyors with common loading heads in the lower, or haulage, headings, and rooms will be mined on the retreat by 20-hp. shakers with automatic duckbills. All-steel 4-ton cars are installed. Shallow ventilating shafts were sunk to two seams and concreted. Each is equipped with an 8H-72 Aerodyne fan (25-hp. 220-volt motors) with a capacity of 100,000 c.f.m. at 1-in. water gage.

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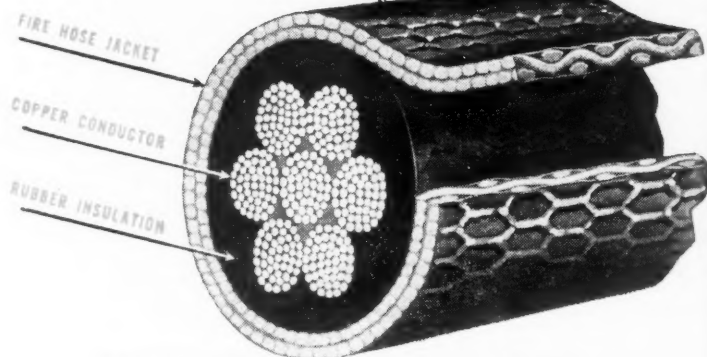
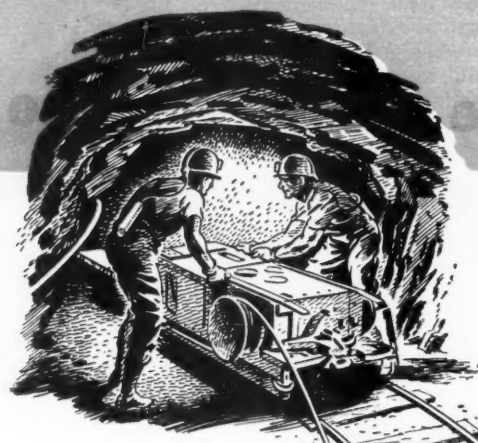
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should have lasted a year in seven to eight months.

An 8-BU Joy was acquired in 1937 as the initial step in a program designed to increase efficiency and extraction. It was first used in entry driving with some success, and also was applied to room work. A change in the character of the top, which forced a narrowing of places and heavy crossbarring, resulted in pillar work (done by hand) getting farther and farther behind room work, leaving more and more pillars standing. A new pillar system was devised around use of the Joy loading into cars but pillaring still lagged and loader tonnage was not realized.

Some form of trackless mining was concluded to be the answer and so 42D shuttle cars were installed to supplement a 7BU installed in 1939 and another since. Operation started in October, 1941, with 13-man crews, first in six 450-ft. long rooms and then, before pulling the pillars, returning to entry driving. Average advance in four headings was 21 ft. a day.

The 450-ft. rooms, it was decided, were too long, but the entries had been driven, so stub entries were driven half way between the barriers and rooms 14-ft. wide on 60-ft. centers about 200 ft. deep were worked on the way back. Working on this plan, it was found essential to drive all places, including crosscuts in mining pillars (14 ft. wide, leaving a 7-ft. fender next to the gob for the final step), on sights. Also, it was found that best results were obtained by driving only one pillar crosscut at a time and by operating on a break line of approximately 30 deg. instead of the usual 45. This angle of break matches roof cleavage and resulted in quick, clean falls and a better recovery of timber.

One section conformed to no rules

and consequently was worked by ear. But as a result of previous studies and experience, good recovery and good caves were obtained and the section was cleaned up in three months with the help of the shuttle cars, whereas it would have required six months with any other method.

In the experimental period, out of an area estimated to contain 162,925 tons, production was 156,870 tons, or 96.28 percent. In this experimentation, Mr. Oliver declared, it was learned (1) that rooms must be driven straight and on sights; (2) that extraction on the advance should be 25 to 30 percent; (3) that pillar crosscuts should be driven on sights; (4) that the roof cleavage should be found and the break line established accordingly; (5) that pillar recovery should be laid out in advance the same as other work; (6) that pillars should be mined immediately; (7) and that pillars should be laid out for continuous operation.

Finding roof cleavage lines has proved very helpful at his properties, said Mr. Rupp in opening the discussion. Additional study of pillar work is necessary to increase coal recovery, declared Mr. Cammack. Answering questions, Mr. Oliver stated that leaving 2 to 3 in. of coal made a good roadway for the shuttle cars. If a break occurs and time permits, it is filled with cinders and cement, which have proved quite successful. Open-ending pillars was tried, but was found less satisfactory than crosscuts and fenders. The mine is sprinkled and rock-dusted, but the water normally does not affect the shuttle-car roadways.

"In April, 1942, it became necessary for the Kaiser Co., Inc., to find a source of coking coal for its new steel project at Fontana, Calif.," said R. G. Heers, general superintendent, Iron and Steel Div.,

Sunnyside, Utah, in opening a description of developing with shaker conveyors for full-retreat mining at Sunnyside No. 2 mine. The requirements were 2,016 tons daily six days per week. Arrangements were made with the Utah Fuel Co. to lease on a royalty basis with Utah Fuel to reopen the No. 2 mine.

Considerable work, including cleaning up and tracking 8,000 ft. of old motor road, was necessary in reopening. Most of this work was finished by Dec. 1, 1942, and arrangements were made for direct operation by Kaiser. Three shifts a day were worked and an average output of 1,500 tons daily was obtained by July, 1943. If sufficient manpower had been available, it would have been possible then to meet the steel-plant requirements. By August, enough places had been opened up so that all equipment was in use, enabling a change to two shifts, increasing efficiency and easing the problem of supervision. Production reached 2,016 tons in November, with 200 men working underground.

The Lower Sunnyside seam worked averages 10 ft. in thickness and pitches 8½ percent. A variable top results in inconsistent production. Overburden at present averages 1,000 ft. and in the next few years will exceed 2,500 ft. The area being opened includes the Sunnyside fault zone extending 1,300 ft. up and down the pitch, and in which the mining plan must be made up as operation proceeds to conform to the major fault. Approximately ten distinct faults have been encountered and crossed to date.

"Access is by outside motor road to and through a worked-out mine to a set of four slopes. So far, eleven room entries have been turned from the slopes. Room entries will have an ultimate average length of approximately 4,000 ft. as a result of opening but one set of slopes rather than two. But it was felt that any disadvantages would be offset by increased concentration, ease of supervision, flexibility, improved ventilation, increased recovery and less hoisting and auxiliary facilities and labor.

"The two center slopes are driven downhill 350 ft. at a time by an 11-BU loader served by Jeffrey chain conveyors, after which the outer slopes are driven back up by shaking conveyors. The best progress made downslope was 125 ft. per week. The combination of the cat-mounted loader and chain conveyors has proved successful and especially flexible in crossing the faults. The largest fault required a 200-ft. rock tunnel, which was driven with a Sullivan three-drum scraper loader."

Room entries are driven about 8 ft. high and 18 ft. wide with 2 ft. of top coal left to protect the roof. In areas of bad top, openings sometimes are narrowed to 12 ft. Entries consist of two headings. A shaker is used in each, with a common loading point on the lower, or tracked, heading. Grade averages 1½ percent in favor of the loads. Conveyors are moved every 300 ft. and the headings are advanced 375 to 400 ft. ahead of the discharge point, which allows 75 to 100 ft. to set up and install the duckbill and for track for a trip of cars past the next loader-head point.



H. G. Dillon, Westinghouse (left); Raymond Mancha, Jeffrey (seated); and Charles M. Schloss, Schloss & Shubart.

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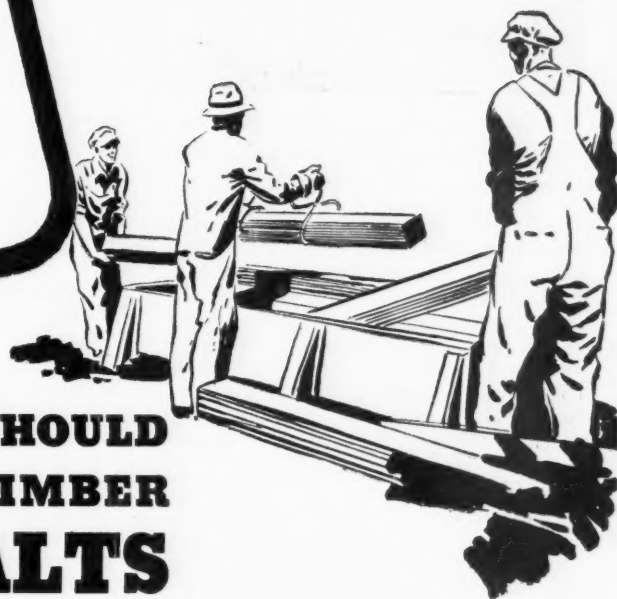
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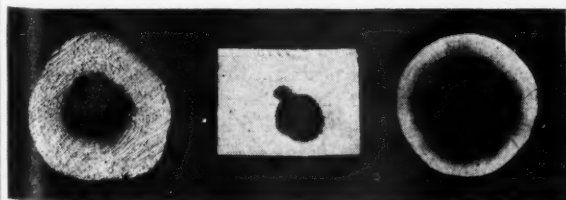
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- ① **LOWER COST...**
because you use native green timber.
- ② **LOWER COST...**
because handling and transportation costs are greatly reduced.
- ③ **LOWER COST...**
because no special, expensive equipment or heating apparatus is needed.
- ④ **LOWER COST...**
because it can be applied with any unskilled labor.



4 REASONS WHY YOU SHOULD TREAT YOUR OWN TIMBER WITH OSMOSALTS

Those four reasons will save you a lot of money and headaches. This is not idle statement, but the proven experience of mines which are successfully treating their timbers with OSMOSALTS. Generally their source of supply is standing timber on their own property. In addition to the savings effected, they obtain dry, clean, odorless treated timbers which are safe and easy to handle. Write today for all the facts.



Illustrated above are cross sections of three kinds of timbers. The white outer areas, which have been subjected to standard color reagent tests, show the deep penetration of the toxic chemicals in Osmosalts.

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BRANCH AND SALES OFFICES: BIRMINGHAM 3, ALA.; DENVER 2, COLO.; KENOV, W. VA.; HARLAN, KY.; MT. VERNON, ILL.



William H. Mott (left), General Electric Co.; J. B. Burns, Colorado-Utah Coal Co.; E. A. Morgan, federal inspector; and George C. Watson, Domestic Coal Co.

In driving crosscuts and room necks, two cuts are taken from one side and one from the other, permitting 75 percent of the coal to be loaded with the duckbill. "Some crews avoid shoveling the remaining 25 percent by setting the cutting machine in the room neck or crosscut and dragging the coal with the cutter chain to the duckbill." In most room necks the last cut is left until the room work comes back to it under the full-retreat system employed.

Crew size varies from six to nine men, depending upon the manpower supply. The standard is eight for two places, with a ninth for general and utility work. "Performance in normal entry work, including hauling the coal out to the slope, runs about 16½ tons per man-shift. Production from an average entry is 64 tons per shaker shift, including time lost during moving. An average of 1½ 9-ft. cuts is made per place per shift. Entries are advanced 400 to 600 ft. per month, 600 ft. being the standard with full-sized crews."

Moves are made normally about every two weeks, one unit being pulled up by the cutter and the other skidded onto the track and jacked up for 6-in. wheels so it can be pushed by the locomotive. "Time consumed ranges from 8 to 14 hours, depending upon the ability of the crew." Equipment now in use consists of twelve G-20 shaker drives with No. 3 troughing ball frames and Types E, A and HAD duckbills.

In one room-and-pillar entry, said Mr. Heers, an 8-BU loader was used in two places served by shaker conveyors. The crew consisted of eight to nine men, including supervision and haulage to the slope. "Production averages about 20 tons per man in this territory and production per loader shift equals 170 tons."

Haulage equipment includes 8-ton Jeffrey cable-reel locomotives, Nordberg slope hoist and 15-ton Westinghouse locomotive to the tippie. A 7-ft. Aerodyne fan

exhausts 115,000 c.f.m. at a 1-in. water gage. Haulage power is supplied by two 300-kw. Westinghouse rectifiers and all other equipment is 220-volt a.c. served from portable transformer substations (2,300 for the main hoist).

"Tonnage per man-shift underground, excluding construction work, is averaging 10.8," said Mr. Heers. "It is expected that this performance will steadily improve as development work is completed and a normal proportion of room-and-pillar work is reached. It has been shown at Kaiser-Sunnyside mine that with the proper equipment, planning and supervision, development work can be made to pay. Thus, one of the main objections to full-retreat mining is overcome."

Describing briefly a method of loading onto shaker conveyors developed by George Schultz, vice president, Liberty Fuel Co., Latuda, Utah, Louis Reese, general superintendent, stated that in 52-in. coal pitching an average of 8 percent an 8-BU loading onto three shakers is able to produce more than in loading into cars in other sections. The system, he declared, is more flexible and easier on the men. The best record so far, with an eight-man crew, has been 285 tons in one shift from eight cuts. A special attachment is used to facilitate moving pans.

How federal coal-mine inspection is set up and carried on in the Rocky Mountain region was detailed by E. A. Morgan, Denver. "The primary purpose of federal coal-mine inspection, working in cooperation with state and federal agencies, labor organizations and workmen, is to reduce the accident record in coal mines for the benefit of all concerned," declared Mr. Morgan. "Never in the history of the world have accidents and uninterrupted operation of coal mines been so important as during the past two years and in the immediate future. Many improvements have been made by the managements of the operating companies. They have taken

measures to correct hazardous conditions brought to attention in reports of mines inspected, but there are indications that much remains to be done if the mining industry is to achieve its goal at the top of the list for the best accident record among the major industries of this country."

The National Safety Council, said W. H. Forbes, of that organization's Chicago staff, is expanding its work in mining safety to conserve manpower and attain its other benefits. He urged increased affiliation by coal-mining companies. Carrying out that thought, the institute voted to affiliate itself as a body with the N.S.C. Coal Section.

Late developments in mine priorities were sketched by John L. G. Weysser, chief, coal section, Mining Division, War Production Board, Washington, D. C. If things go well in the present military campaigns, said Mr. Weysser, the supply situation will be relatively good. But if trouble should be encountered, military requirements may again bring about a tight condition. Mines should keep this possibility in mind and continue to economize on materials. On equipment, the problem still is one of getting that available to the points where it will get the most of the most-needed coals.

Coal preparation at the Sunnyside property of the Utah Fuel Co., Sunnyside, Utah, was detailed in a paper by Carl S. Westerberg, preparation engineer, Castle Gate, Utah, read in his absence by Charles M. Schloss, Schloss & Shubart, Denver, Colo. A description of this plant by Mr. Westerberg appears in this issue, p. 71.

Excluding room or tubing blowers, underground mine fans fall into two general classes, said Raymond Mancha, Jeffrey Mfg. Co., Columbus, Ohio. The first is the auxiliary, or booster, fan generally installed well inside to handle one or more hard-to-ventilate or high-resistance splits. The second is the shaft-bottom type made possible by the recent compact, highly efficient axial-flow fan. Where a surface fan is available and there is reason to change, such an axial-flow fan may be placed on the bottom and the old fan kept as a standby.

Booster fans, said Mr. Mancha, have gotten a black eye because they frequently are wrongly used. Boosters should not, as a rule, be installed if there is another economical way out, but under some conditions they are the logical answer to a ventilating problem. The two principal hazards with booster fans are recirculation as a result of leakage through stoppings and, when boosters are installed without changing the output of the main fan, the robbing of other splits. In installing a booster, said Mr. Mancha, it should be required to take care of only the increased pressure necessary to put the additional air through the split and the main fan should be speeded up to supply the additional pressure that the change in volume will necessitate. Doing the job by speeding up the main fan to help out normally reduces the power requirements about 40 percent or more as compared with putting the whole load on the booster.

In the case of shaft-bottom fans, it



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sometimes is hard to find a place for a new fan on the surface, and by putting it on the bottom, retaining the old unit as a standby, the installation can be made without loss of operating time. If the explosion doors of the old fan are opened, it normally will not be affected by an explosion and thus is available for service. The objection to shaft-bottom fans that they might be wrecked by an explosion and block the airways can be met by installing them in a "shoo-fly" or run-a-round opening.

With a two-sided mine, a shaft-bottom installation permits working each at the required pressure with a substantial power saving. Where two-compartment shafts are employed, the average pressure on the curtain wall is reduced to a small fraction. While conceding that with a shaft-bottom unit the tendency would be to leak bad air into good through the curtain wall, the percentage is too small, Mr. Mancha asserted, to be detected in the intake.

Two Systems Better Than One

Two ventilating systems, said Mr. Mancha, are more reliable than one, and with a shaft-bottom fan and surface standby the surface unit cannot be wrecked because it is isolated from the system and thus always is available. If a shaft-bottom fan is properly installed close to the shaft, it is no more dangerous, Mr. Mancha concluded, than any pump and certainly less hazardous than a trolley line.

The tentative safety standards of the Bureau of Mines do not bar underground fans if properly installed and supplemented by an automatic power cut-off, said Mr. Morgan.

"Bituminous Coal Research—A Program to Increase Coal Utilization," presented at the meeting of the American Mining Congress (June Coal Age, p. 96) by Charles S. Baton, George S. Baton & Co., Pittsburgh, Pa., was read in Mr. Baton's absence by Mr. Oliver. In the discussion, B. E. Schonthal, B. E. Schonthal & Co., and secretary, Illinois Mining Institute, Chicago, made the point that great progress in this respect can easily be offset by suspensions and inability of users to get coal. He declared that coal needed a contractual arrangement that would enable sales departments to operate on a basis of 10 years ahead if necessary. Coal now has its best opportunity but will lose it if it cannot assure its customers a continuous supply. When suspensions can be eliminated, research will pay dividends, Mr. Schonthal asserted.

The problem of increasing coal use is a big one, said Mr. Pape, but progress is being made. To get the most at the earliest possible date, everybody should support the program. Production of liquid fuel from coal must be pushed to find out how cheaply it can be made, and Mr. Pape recommended support of the federal program. The discussion also brought out considerable sentiment for retention in the hands of the coal industry of complete control over production of fuels, byproducts and the like clear through to the finished product. Several pointed out that processes already are available for producing

smokeless fuel and byproducts and felt that they might be accepted and used rather than relying on the federal program. All were in agreement, however, that it is time to get started.

Supreme Court Bars Portal Review Now

The U. S. Supreme Court denied May 29 a request from the United Mine Workers for an immediate review of a decision by the western Virginia Federal District Court that coal miners are not entitled to wages for portal-to-portal traveling time. The union had previously appealed the District Court decision, involving Local No. 6167, U.M.W., and the Jewell Ridge Coal Corp., to the Fourth Federal Circuit Court. Under usual procedure, an appeal to the Supreme Court would be taken after the Circuit Court announced its decision.

Counsel for the miners, however, informed the Supreme Court that they wished to eliminate the time required for the Circuit Court to act and preferred to have an early, final decision by the Supreme Court. They contended in their petition that "the public interest would be promoted by prompt settlement in the Supreme Court of questions involved."

At the same session the Supreme Court denied rehearing in the Tennessee Coal, Iron & Railroad case. It had earlier affirmed decisions of a Federal District Court in Alabama and the Fifth Circuit Court of Appeals holding that underground travel time in ore mines is time worked for which compensation must be paid under the Federal Wage and Hour Law.

Personal Notes

GEORGE H. LOVE, executive vice president, has been elected president of the Consolidation Coal Co. with headquarters in New York City. He succeeds the late Malcolm McAvity. Formerly president of the Union Collieries Co., Oakmont, Pa., now also under Consolidation control, and



George H. Love

vice president of the Western Pennsylvania Coal Operators' Association, he became executive vice president of Consol March 17, 1943, when he also was named to membership on the board of directors and chairman of the executive committee.

VAUGHN MANSFIELD, chief engineer, Southern Coal Co., who moved recently to Memphis, Tenn., from Louisville, Ky., was among 31 executives honored by the Memphis Chamber of Commerce at a breakfast for newcomers May 31.

ARTIE HILL, Sayreton, Ala., has been named by Governor Sparks of Alabama as a member of the State Board of Examiners, Division of Safety and Inspection, Department of Industrial Relations. Mr. Hill, whose term will expire in July, 1945, succeeds M. S. Bailey, who was killed in the Sayreton mine explosion early this year.

JOHN HILL, Jenkins, Ky., has been named safety director by the Consolidation Coal Co., vice F. M. CORRELL, who recently retired after 25 years' service with the company.

HENRY LEDFORD, general manager, Hot Spot Coal Co., Premium, Ky., has resigned to accept similar work with the New Acorn Coal Co., Blackey, Ky.

ARTHUR DIXON, manager, Dixon-Caudill Coal Co., Whitesburg, Ky., has been named District Commander of the American Legion in eastern Kentucky.

GEORGE TARLETON, Somerset, Pa., has been made general manager of the western division of the Consolidation Coal Co., with offices in Jenkins, Ky.

E. R. KAISER, a member of the staff of Battelle Memorial Institute, has joined Bituminous Coal Research as assistant director as of July 1, with offices at 719 Oliver Building, Pittsburgh 22, Pa.

STANLEY B. JOHNSON, president of the Lorado Coal Mining Co., with headquarters in Columbus, Ohio, has been elected chairman of the board of directors, a newly created position. LAWRENCE J. LORMS, general manager, was named president to succeed Mr. Johnson. The Lorado Coal Mining Co. is a wholly owned subsidiary of the Lorain Coal & Dock Co. with mines at Lorado, Logan County, W. Va.

Preparation Facilities

LIVE OAK COAL CO., Minersville, Pa.—Contract closed with Wilmot Engineering Co. for two Type D Wilmot Simplex jigs to prepare nut and pea coal; total feed capacity, 40 t.p.h.

CRAB ORCHARD IMPROVEMENT CO., Eccles, W. Va.—Contract closed with Kanawha Mfg. Co. for washing and material handling equipment for re-treating refuse from existing air cleaning table, to consist of gate in existing refuse bin, scalping vibrator screen, Kanawha-Belknap washer, system of belt conveyors to deliver clean product to existing tippie and belt conveyor to deliver rejects to

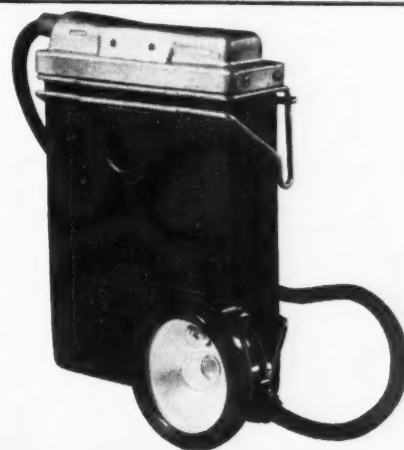
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I am glad that in this lamphouse we don't have to make repairs or recondition our lamps. Factory-to-lamphouse service is really something.



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5. Battery solution (free) limited to one ounce total both cells.
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8. Designed for self-service charging system for lowest lamp-house operating cost.
9. To charge, headpiece is simply slipped on to key in charging rack, and turned to make contact. Nothing to take apart — unit-sealed construction.



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RUGGED - DEPENDABLE
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aerial tram hopper; capacity, 35 t.p.h. raw feed.

WINDING GULF COLLIERIES, Goodwill, W. Va.—Contract closed with Kanawha Mfg. Co. for Kanawha-Belnap washer for egg coal; capacity, 40 t.p.h.

A. J. MOORE, Schuylkill Haven, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty diagonal-deck coal washing table to treat No. 5 buckwheat coal.

Senate Group Boosts Mine Bureau Funds

The Interior Department appropriation bill for the 1945 fiscal year (beginning July 1 this year), previously passed by the House and reported from the Senate Committee on Appropriations, shows generous increases on many items of direct concern to the coal industry. The total carried in the House bill was about \$87,000,000, to which the Senate committee added \$35,000,000, bringing the total to \$122,000,000.

For operating expenses for the Solid Fuels Administration the House bill carried \$4,669,000; the Senate committee raised this to \$5,025,000 and then added \$700,000 as a separate fund for financing SFA activities in a "nation-wide program or fuel conservation, for the preparation and dissemination of information, including radio and still and motion pictures."

With respect to funds for the U. S. Bureau of Mines the House bill allowed \$772,595 for operating mine rescue cars and stations and investigations of accidents. The Senate committee raised this to \$822,595. For coal-mine inspections and investigations the House bill provided a total of \$936,270 (which included \$118.39 in conformity with a Budget Bureau recommendation that provision be made for 45 additional coal-mine inspectors). The Senate committee concluded that 45 additional inspectors were nowhere near enough and recommended that provision be made "to enable the Bureau to put 90 additional inspectors in the field, pay their expenses, equip them and render the auxiliary office and laboratory services that are necessary to make their work efficient and effective." To carry out this recommendation the committee added \$591,610 over and above the total carried in the House bill, making the total figure for coal-mine inspection and investigation \$1,527,880.

Funds for enforcement of the Federal Explosives Act were increased by the Senate committee from \$575,000 (as carried in the House bill) to \$600,000.

To enable the Bureau of Mines, "independently or in cooperation with other agencies, to initiate and augment measures to prevent subversive activities from interfering with the extraction and processing of materials," the House bill appropriated \$250,000, which was increased by the Senate committee to \$300,000.

The Senate committee recommended \$131,000 to finance the investigation of ways and means to increase the production

of anthracite, and also recommended \$8,000,000 "for the construction and operation of demonstration plants to produce synthetic liquid fuels from coal, oil shale, agricultural and forest products and other substances" (in conformity with the bill recently enacted by Congress authorizing this venture).

The Senate committee made slight increases in the funds for maintenance of mining experimental stations; increased the specific amount provided for the buildings and grounds at Pittsburgh, Pa., and slightly increased the funds provided for investigation by the Bureau of Mines and dissemination of information concerning the "economics of mineral industries," and added to the bill \$6,000,000 for investigation by the Bureau of Mines of the raw-material resources for steel production.

D and Oregon Mines Win Safety Trophies

D mine, Union Pacific Coal Co., Superior, Wyo., with a perfect record, captured top honors for bituminous mines in the 19th annual "Sentinels of Safety" competition of the U. S. Bureau of Mines. Oregon slope mine, Morgan Coal Co., Pittston, Pa., won the anthracite group trophy. Employees of D mine worked 307,529 man-hours in 1943 without a lost-time accident, while Oregon mine employees worked 49,742 man-hours with one lost-time accident causing nine days

of disability, the accident-severity rate being 0.181.

In announcing the winners, Dr. R. R. Sayers, Director, U. S. Bureau of Mines, said that of 389 mines and quarries in 37 States that competed, 85 had accident-free records during the year. The trophies are donated by the *Explosives Magazine*.

Certificates of honorable mention for outstanding safety records were awarded to:

Bituminous coal mines—Apple No. 2 mine, Apple Coal Co., Glasgow, Pa.; Maryland Union No. 1 mine, Maryland Union Coal Corp., Mt. Savage, Md.; Irish Rock mine, Irish Rock Coal Co., Gaysport, Ohio; Rockhill No. 1 mine, Rockhill Coal Co., Robertsdale, Pa.

Anthracite mines—Midvalley mine, Hazle Brook Coal Co., Columbia, Pa.; Reliance mine, Philadelphia & Reading Coal & Iron Co., Mt. Carmel, Pa.; Eckley mine, Jeddo-Highland Coal Co., Eckley, Pa.; No. 14 mine, Colonial Colliery Corp., Natalie, Pa.

Mines Reopening

Rochester & Pittsburgh Coal Co. has resumed operations at its Beechtree mine, near Punxsutawney, Jefferson County, Pa., after being idle for 63 years.

Susquehanna Collieries Co. has taken back property leased to the Colonial Colliery Co., Marion Heights, Pa., and plans to resume operations there.

Crescent Mining Corp., St. Clairsville, Ohio, plans to open a stripping operation at Speidel, nearby.



"Personally I get a big kick out of it—but I think my wife's havin' me watched."

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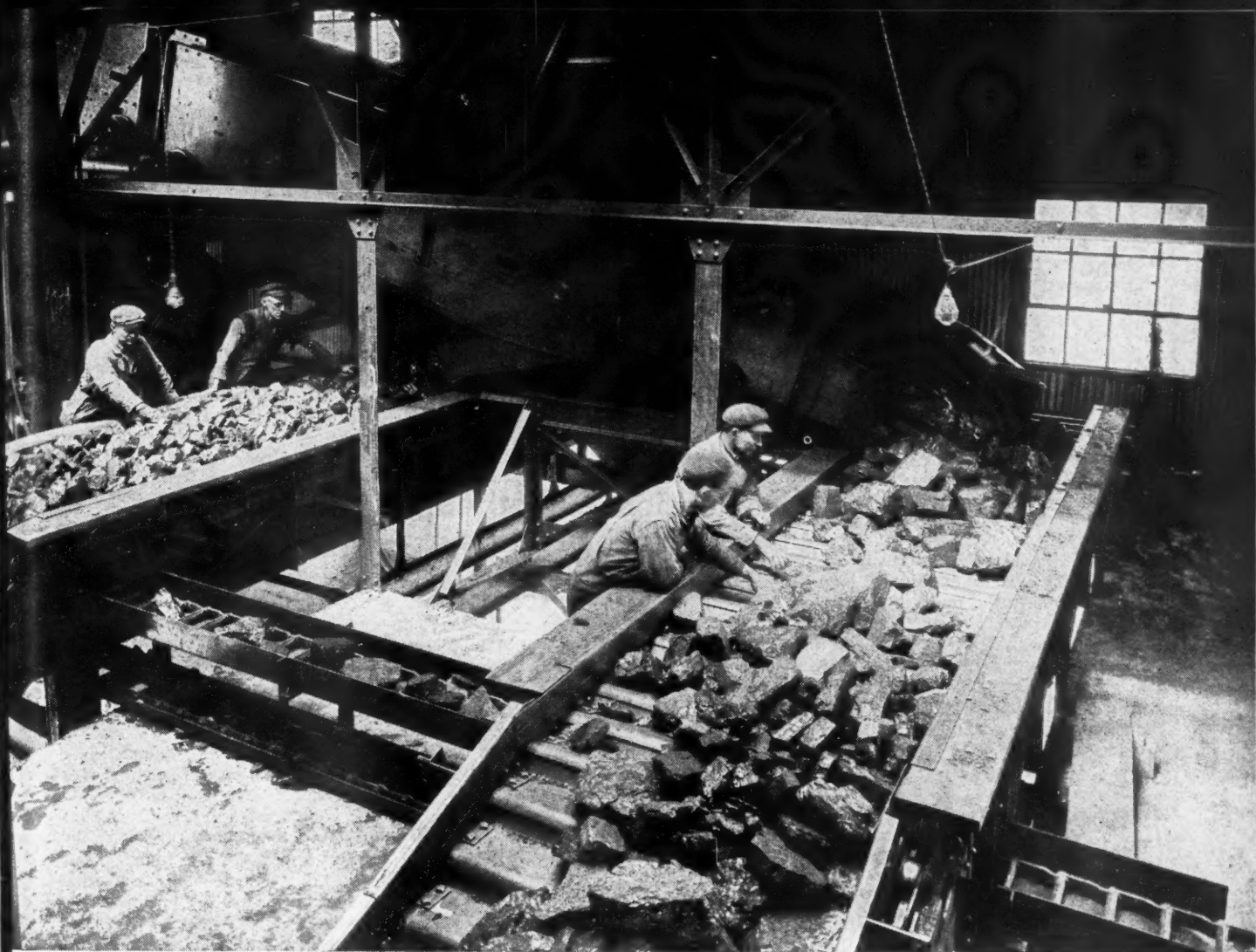
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At the coal tippie pictured above, S-A Pan Conveyors serve as picking tables. A drag chain conveyor carries off the refuse.

It's "EASY PICKIN'S"

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Another Example of S-A Help at Every Stage of Material Handling

The various processes involved in handling coal from mine to car require utmost efficiency at every phase to assure profitable operations. The Stephens-Adamson Picking Tables shown here are typical of S-A's ability to help operators achieve low cost, rapid handling all along the line.

Regardless of the problems involved in your operations, look to S-A for practical

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It offers, in addition, the services of a highly skilled staff of engineers, men fully qualified to combine that equipment into the exact system *your* operations require.

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To Tighten Control On Industrial Hiring

A nation-wide system of priority referrals requiring employers to hire male workers (except for agriculture) only with the approval of the U. S. Employment Service or with the approval of such other private agencies as U.S.E.S. may specify (union hiring halls, etc.), is to be inaugurated July 1 by the War Manpower Commission. Workers are to be referred to work in accordance with its importance to the war effort, but with "maximum possible freedom of choice." Manpower priorities committees are to be set up in the 184 shortage areas to assist in deciding which industry comes first in the referral of available male labor.

WMC Chairman McNutt asserted June 2 that "more effective means must be used to get men into the mines if industry is to get an adequate flow of coal needed to keep the nation's wartime machinery running at full speed." At least 30,000 more miners are needed right now, he said, adding that "the operators regard this as a minimum. They would be happier if they could get 50,000."

Projects to Relieve Industrial Surplus

Four projects to help relieve a huge and growing surplus of industrial sizes of anthracite that threatens to cut vitally needed production of domestic sizes unless new markets can be found and to supplement the available supply of industrial sizes of bituminous coals to help meet the growing needs of war plants and other industries, under way by the U. S. Bureau of Mines, were described June 20 at Pittsburgh, Pa., in a paper entitled "The War Problem of Increasing the Utilization of Small Anthracite," by J. F. Barkley, chief, Division of Solid Fuels Utilization for War, U. S. Bureau of Mines, Washington, D. C., and William Seymour, chemical engineer, U. S. Bureau of Mines, Pittsburgh, Pa. The paper was given at the semi-annual meeting of the American Society of Mechanical Engineers.

These projects are burning of mixtures of small anthracite and bituminous slack on stokers; methods of production and burning of packaged fuel made from anthracite fines; the use of anthracite fines in the production of coke; and the use of barley anthracite in gas producers.

Equipment Approvals

Six approvals of permissible equipment were issued by the U. S. Bureau of Mines in May as follows:

Sullivan Machinery Co.—Type 5B-1 shortwall mining machine; 10-hp. motor, 230 volts, d.c. Approval 504; May 4.

Sullivan Machinery Co.—Type 5B-1 shortwall mining machine; 10-hp. motor, 220 and 440 volts, a.c. Approvals 505 and 505A; May 4.

Joy Mfg. Co.—Type PL11-7RPN elevating conveyor for foreign service; 10-hp. motor, 500 volts a.c. Approval 506A; May 6.

Joy Mfg. Co.—Type 11BU-10P loading machine; two motors, 50 and 3 hp.; 440, 500 and 625 volts, a.c. Approval 507A; May 10.

Goodman Mfg. Co.—Type 163B "tractor truck"; two motors, 10 and 10½ hp., 250 volts, a.c. Approval 508; May 23.

Koehler Mfg. Co.—Model W single-shot blasting unit (Wheat Model W cap lamp with blasting attachment). Approval 1225; May 11.

Extension Authorized In Kentucky Field

Authority to construct a line from Central City, Ky., to the W. A. Wickliffe Coal Co.—7.9 miles—has been granted by the Interstate Commerce Commission to the Chicago, St. Louis & New Orleans Ry., subsidiary of the Illinois Central R.R. The new line also will serve virgin territory underlaid with coal but not now served by any railroad as well as territory of coal deposits owned by the Kirk Coal Mining Co.

Four More New Mines To Open Soon

Three new stripping operations and a new drift mine are scheduled to be opened between July 15 and Oct. 1. The Youghiogheny & Ohio Coal Co. plans a strip opening on Sept. 1 at Rayland, Jefferson County, Ohio, with an initial daily capacity of 1,000 tons, but with an eventual goal of 1,800 tons daily. The opening, on the Pennsylvania and Wheeling & Lake Erie railroads, will be in the No. 8 seam and preparation equipment will include picking tables, loading booms and vibrating screens. Frank Kain and Lewis Moscrip are in charge of the development.

The Truax-Traer Coal Co. will open a stripping operation at Hazen, Mercer County, N. D., on Oct. 1, with a daily capacity on opening of 2,500 tons. The operation is on the Northern Pacific R. R. and will be equipped with a Bucyrus-Erie 320B 10-cu.yd. stripper and 50B 3-cu.yd. loader, as well as a seven-track tippie making all prepared sizes, with shaker for large and vibrator for small. Haulage equipment will consist of six Euclid 20-ton semi-trailers. N.P. will construct a 6-mile spur to the property; living quarters will be provided in a small camp at the mine and there will be an addition to the village of Hazen. Power will be purchased from the Dakota Public Service Co. Alfred Kelsen is superintendent and H. N. Hicks is construction engineer.

Michael Pontarelli & Sons-Starrett Brothers, Inc., is scheduled to open a stripping operation July 15 at Clarksville, Johnson County, Ark., with an eventual daily capacity of 500-1,000 tons. Working the Spadra Smokeless seam, on

the Missouri Pacific R. R., the equipment, in addition to large stripping machines, includes a shaker screen, and haulage will be by trucks. Michael Pontarelli and R. W. Starrett are in charge of operation.

Joe Guthrie, Yancey, Ky., is in charge of development of a drift mine now under way at Pineville, Bell County, Ky., on the Louisville & Nashville R. R. for a company as yet unnamed. The mine, scheduled to be opened Sept. 1, with an eventual daily capacity of 500 tons, will have Joy loaders, Morrow Junior tippie, Jeffrey locomotives and drop-bottom cars. Sidetracks are to be provided and the shipping point will be Ramona, Ky.

Non-Mining Men Get Pay Boost

Earnings of 3,000 non-mining coal-company employees in West Virginia fields moved closer to the wages of coal-producing men June 9 as the Fifth Regional War Labor Board, Cleveland, authorized level 5 percent increases to employees of about 110 companies.

The regional board's go-ahead was given upon application of four West Virginia coal operators' associations which voluntarily had sought across-the-board increases of 10 percent for the mining firms they represent. The request was modified by the board to 5 percent on the ground that the larger figure was in violation of the national wage stabilization program.

Obituary

COL. WARREN RUSSELL ROBERTS, 80, head of the well-known Chicago engineering firm of Roberts & Schaefer, which he founded, with the late John V. Schaefer, in 1904, died suddenly June 22 of angina pectoris at his home in Miami, Fla. The firm has designed and constructed many structures for coal handling and treatment. Mr. Roberts retired from active participation in the company's work in 1939.

A. M. VICARS, 87, died June 20 at his home in Wise, Va., after several days' illness. A pioneer among Kentucky-Virginia coal men, he was for many years closely identified with the Wise Coal & Coke Co., Esserville Coal Co., Norton Coal Co. and others.

J. N. BEATTIE, 62, for several years safety director for the Koppers Co., Weeksbury, Ky., was found dead in bed June 19.

JOHN R. MACISAAC, 74, general traffic manager for the Dominion Steel & Coal Corp., died June 23 at his home in Sydney, Nova Scotia.

W. E. DEEGANS, 69, coal operator, died June 15 at his home in East Rainelle, W. Va. In 1908 he organized the Pocahontas Smokeless Coal Co. at Welch, McDowell County, W. Va. Over the years he had organized or owned at least 15 mining companies and in the early

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COAL AGE



AMERICAN

Type AC-3 F

ROLLING RING CRUSHER

CAPACITY 300 TONS PER HOUR
-- 3/4" SCREENINGS

CAPACITY STEPS UP TO 400 TONS
PER HOUR ON 1 1/4" SCREENINGS



Why you get Splitting Action instead of Crushing

● Patented reversible manga-
nese steel SHREDDER-RINGS
are found only in the American

Rolling Ring Crusher. The Rings have twenty cutting
edges or teeth and are designed to maintain their
outward position by centrifugal force at specific
speeds. In contact with solid metal the rings are
momentarily deflected from their usual course because
they are free to swing back out of position. No shear
pins or other safety devices that require attention.

**GREATER RANGE OF REDUCTION—UNIFORMITY OF SIZE
CRUSHING AT LESS THAN ONE CENT A TON
EXTREME SIMPLICITY OF OPERATION**

● When the Southwestern Illinois Coal Corporation in-
stalled this Type AC-3F AMERICAN Rolling Ring
Crusher at their plant in Percy, Illinois, they, like many
other operators, were immediately equipped for low
cost, fast, dependable crushing.

AMERICAN Rolling Ring Crushers are externally ad-
justed—easily accessible and compact. You can get an
AMERICAN Rolling Ring Crusher in the correct type
and size for your requirements. Regardless of the type
we find practical for your purposes you are assured of
large daily tonnages of coal properly sized at extremely
low cost. We will gladly make
recommendations at your request.

AMERICAN PULVERIZER COMPANY 1119 MACKLIND AVENUE
ST. LOUIS, 10, MISSOURI
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

twenties maintained offices in Huntington from which he managed several going operations. He founded the Bank of Mullens, W. Va., and was president of the National Bank of Thurmond, which interest he sold in 1919. At one time he also was president of the American Bank & Trust Co., Huntington.

Discussion Held On Alloy Steels

The June meeting of the Mining Electrical Group of Southern Illinois, held at West Frankfort, Ill., and conducted by Greswold Van Dyne, manager, special steel department, Joseph T. Ryerson & Son, Inc., Chicago, had for its subject "Getting the Most Out of Alloy Steel." Mr. Van Dyne stressed these points: "To get the good of an alloy steel it must be heat-treated. Ninety percent of failures are from fatigue, and it does not take much to cause localized stress."

As a preliminary he stated that any steel containing 0.30 percent carbon can be hardened and then defined four terms common in discussing and using steels: (1) Tensile strength—pounds per square inch to cause rupture, or break the piece. (2) Yield point—the stress at which a piece stays bent, or the point where a permanent set takes place. (3) Reduction of area—percent of reduced area at the rupture point. (4) Elongation—percent of stretch in a standard test length.

"All these factors," said Mr. Van Dyne, "have a definite relationship. If certain steels be heated to the same temperature and cooled at the same rate, the results will be the same. The faster a steel is

cooled, the harder it gets and the higher is the tensile strength."

This accounts for the fact that similar steels do not necessarily have the same characteristics when received from the mill. A bar rolled on an August afternoon will not have the same tensile strength as a bar made on a January morning. After machining or fabrication, heat treatment will correct that. Parts being heat-treated must be soaked long enough to attain a uniform temperature before quenching.

The design and fabrication of machine parts have a great effect on the local stresses set up and the chance of failure. It is important that changes in shaft size have heavy fillets, that notches be avoided and pads be provided for press fits. Excess shrinkage is bad, heavy tool cuts should be avoided and tool marks be eradicated.

Discussing the war effect on the manufacture of alloy steels, Mr. Van Dyne pointed out the inability to get certain alloy ingredients in quantity, and that the necessary use of scrap with varying alloy content made it impossible to make steels to a definite formula. Steels are now being used in which the alloy elements are within certain high and low limits. "These, however, are satisfactory," said Mr. Van Dyne.

Says Britain Needs Strip Equipment

Lord Hyndley, chairman of the London Coal Committee of the Combined Production and Resources Board, was quoted by the Board last month as saying that assistance from the United States in supplying both strip and deep mining machinery

will place Great Britain in a better position to aid United Nations demand for coal. Great Britain's program for the coming year calls for further mechanization and strip mining is destined to play an increasingly important part.

The stringency of the coal position in the United Kingdom, Lord Hyndley said, places a limitation on the amount that Great Britain can furnish to the United Nations. Increase in strip production will depend almost wholly on how much equipment can be supplied by the United States.

Strip Pits Open

Work on a strip mine owned and operated by Jack Pickford, of Harrisburg, and located just outside of Equality, Ill., was resumed, and the coal vein has been reached. The L. & N. RR. Co. is erecting a tipple near the freight office.

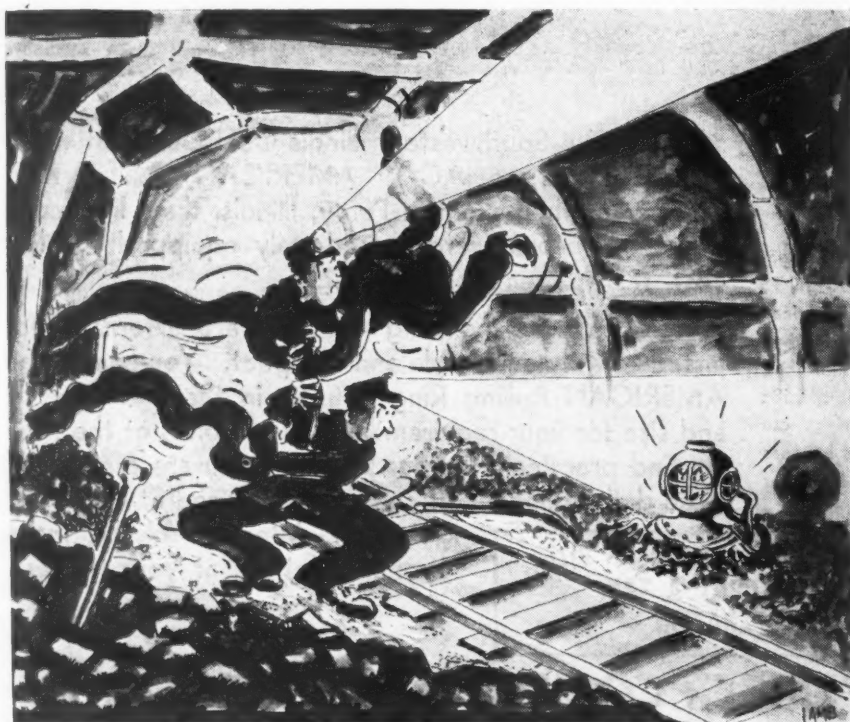
The largest strip operation in the history of the locality was scheduled to get under way July 1 at Williston, N. D., where a 10-ft. vein of lignite will be worked on a 300-acre tract. Three Williston men, E. F. Lovejoy and W. M. and L. B. Ledahl, said they hoped to produce 60,000 tons this season.

New Floyd Co. Mine

Floyd Elkhorn Coal Co. reports that work has started on buildings and equipment preparatory to opening a mine that will operate on 1,000 acres of land on Caney Fork of Middle Creek in Floyd County, Kentucky. It is planned to start shipping in late autumn next, with around 125 men employed and 800 to 1,000 tons eventually to be loaded daily.

Association Activities

HARRY LAVIERS, president, Princess Elkhorn Coal Co., was reelected president of the Big Sandy-Elkhorn Coal Operators' Association at its annual meeting June 2 at Ashland, Ky. Other officers named are: B. F. Reed, secretary-treasurer, Turner Elkhorn Mining Co., vice president; M. H. Forester, vice president, Consolidation Coal Co., treasurer; H. S. Homan, secretary, and the following directors: J. E. Bowman, vice president, Utilities Elkhorn Coal Co.; L. C. Campbell, vice president, Koppers Coal Division; J. F. Caulfield, treasurer, Elk Horn Coal Corp.; Harry B. Crane, general superintendent, Elk Horn Coal Corp.; H. K. English, vice president, Clear Branch Mining Co.; M. H. Forester, W. W. Goldsmith, receiver, Elk Horn Coal Corp.; J. R. Hurt, secretary, Sandy Valley Coal Co.; Harry LaViers; A. H. Mandt, vice president, Stephens-Elkhorn Fuel Corp.; K. S. McKinney, superintendent, James Hatcher Land Co.; W. F. Pioch, manager, North-East Coal Co.; E. R. Price, general superintendent, Inland Steel Co.; B. F. Reed; Alan J. Smith, president, South-East Coal Co., and George



"Will you guys please let go of the Atlantic cable."



LOAD YOUR COAL with INTERNATIONAL POWER

HERE'S THE *Victory* way of loading coal—by the ton and in a hurry!

The Victory Coal Company, Pittsburg, Kansas, uses an International TD-9 Diesel TracTracTor, equipped with $\frac{3}{4}$ -yard dozer-shovel, to produce a high grade of steam coal on a 400,000-ton strip mining operation near Cherokee, Kansas.

This International shovel combination keeps a fleet of six International Trucks busy hauling an average of six tons of coal each three-mile trip to the grading plant.

This application of International Power in speeding coal from mine to grading plant is only one of many ways in which these versatile trac-

tors are serving the coal industry. Their dependable performance, their variety of sizes, and their adaptability for a variety of jobs—from mine to coal yard—is worth investigating for *your* operations.

Wartime demands on *all* industrial equipment makes it absolutely necessary that you conserve your precious equipment and *make it do*. Harvester and the International Industrial Power distributors stand ready to help you safeguard your present International Power with every service at their command.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

Buy War Bonds... Save and Serve America

INTERNATIONAL HARVESTER
Power for Victory... Power for Peace

2 PRACTICAL WAYS OF USING "VENTUBE"* for safety and efficiency



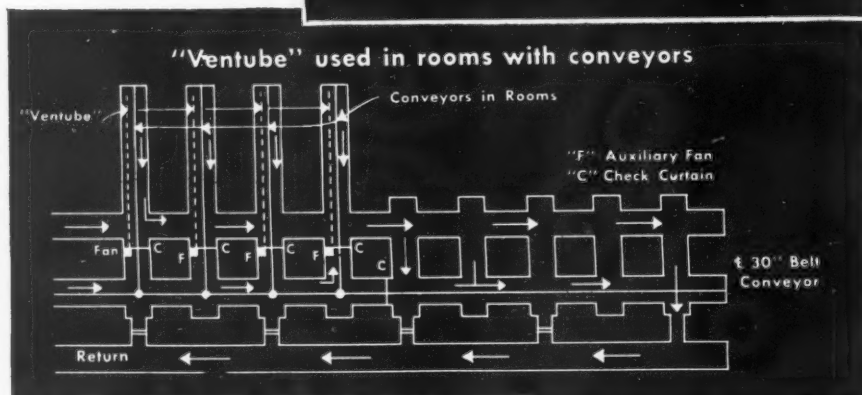
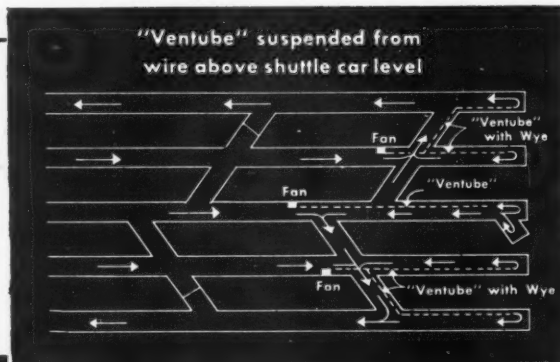
Properly used, blowers and tubing are important assets in many mines today.

"Ventube" carries adequate quantities of clean air up to the dead ends of entries and rooms where the main current would never go unaided, bringing much-needed oxygen to hard-working men. After a blast, "Ventube" clears the face, reduces waiting time and adds productive minutes to every shift.

Here are typical layouts showing correct, convenient fan-and-"Ventube" arrangements. For tubing patterns suitable to other working plans, consult Du Pont.

Typical Methods for Using "Ventube"

to carry fresh air to working faces in coal mines . . . by J. H. Dickerson, Mining Engineer, Huntington, W. Va.



Du Pont "Ventube" is flexible tubing, sturdy fabric impregnated and coated with a special abrasion-resistant compound. It resists heat, moisture, mildew, dry-rot, acid and alkaline waters. It is easily carried and stored.

Properly suspended, free of sharp bends, and attached to a fan with adequate capacity and with permissible motor, "Ventube" flushes the face with fresh air . . . helps remove dust and bad air from any space a man can enter . . . speeds the production cycle . . . promotes health and steady effi-

ciency of workers . . . is a vital part of the nation's war production effort. E. I. du Pont de Nemours & Co. (Inc.), "Fabrikoid" Division, Fairfield, Conn.

NOTE: War Production Board regulations permit us to supply "Ventube" for all mining purposes. To expedite delivery, it is urged that you furnish us with complete priority information on your orders.

DU PONT "VENTUBE"

*"VENTUBE" is Du Pont's registered trade mark for its flexible rubberized ventilating duct.



BETTER THINGS FOR BETTER LIVING
THROUGH CHEMISTRY

Tarleton, assistant to the vice president, Consolidation Coal Co.

SOUTHWESTERN INTERSTATE COAL OPERATORS' ASSOCIATION has reelected as president H. H. Spencer, president, Pioneer Coal Co. Other officers named are George K. Mackie Jr., vice president; K. A. Spencer, vice president at large; Thomas Quinn, vice president for Kansas; John M. Hamm, vice president for Missouri; Joe F. Klaner, secretary; L. E. Compton, treasurer, and J. A. Meyers, George J. L. Wulff, George Nettels, W. G. Parrott and John I. Clemens, directors.

Pittsburgh Coal Co. Starts Reforestation

A program of reforestation to reclaim surface land and to develop future reserves to replace the rapidly dwindling timber in western Pennsylvania has been started by the Pittsburgh Coal Co. The company has planted 50,000 trees on an experimental basis at its Russell strip operation on State Highway Route 980, in Washington County between McDonald and Imperial and near Houston.

As soon as experimental lessons have been learned the company plans to reforest as much of its strip operations surface as possible and to extend the reforestation to other marginal or submarginal farm and pasture areas. At Russell and Houston most of the planting was done by members of McDonald Troop No. 2, Boy Scouts of America, under the supervision of Robert Moore, reforestation expert, of Danville, Pa., who has served as forestry consultant for lumber and mining companies in the Northeastern United States.

The trees used were obtained from the Pennsylvania State Nursery at Clearfield. They are seedling pitch, red and white pine, hemlock and Norway spruce.

Indict Miners Under Smith-Connally Act

Charging violation of the Smith-Connally War Labor Disputes Act, an indictment of 36 persons, including independent miners' officials, was returned May 31 by a special federal grand jury investigating recent Northumberland County (Pa.) coal production stoppages. The jury began its inquiry May 18 after the U. S. Justice Department declared it was concerned over production stoppages at stripping operations in Northumberland County, where free-lance miners were picketing mountain roads in protest against a ban on unauthorized mining.

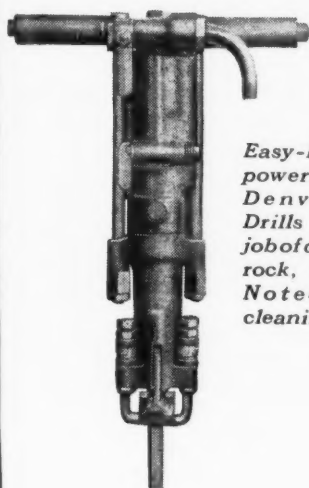
In its first count the indictment charged the accused with unlawfully, willfully and knowingly coercing, instigating, inducing and encouraging employees to interfere by strike and other interruptions with the operations of such coal mines. The second count charged the 36 men with conspiracy to prevent operation of the mines and facilities, which the indictment declared

CLEARING A PATH TO GREATER TONNAGES!

INCREASING tonnages and decreasing costs call for quick removal of rock and tough overburden from the path of stripping operations. For rock slows down work tempo . . . increases maintenance.

Designed to help you clear a path to greater tonnages, Gardner-Denver Rock Drills and Portable Compressors are noted for speeding drilling operations . . . for their ability to help break up rock *faster*. They are famous for their time-saving, cost-saving operation . . . even under the toughest operating conditions. They need no pampering . . . no special attention. Once on a job, they're there to stay.

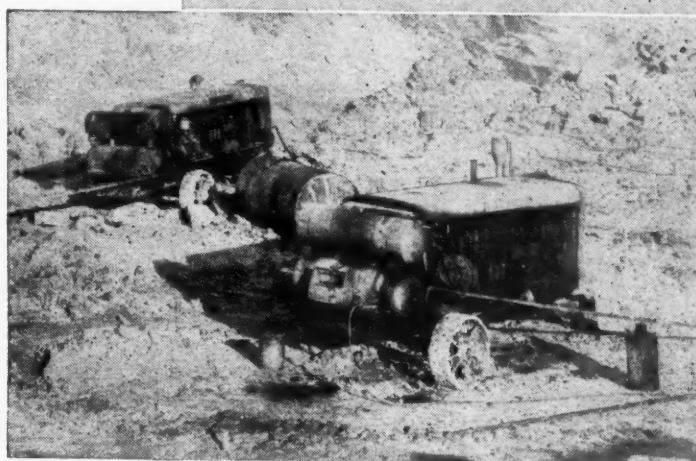
Available in a complete line of gasoline and Diesel powered models, Gardner-Denver Portable Compressors are completely water-cooled for dependable, all-weather operation. They deliver cooler, more economical air.



Easy-handling, yet powerful, Gardner-Denver Sinking Drills make a quick job of drilling in hard rock, coal or shale. Noted for hole-cleaning ability.

For deep hole drilling in the toughest overburden, Gardner-Denver Wagon Drills are easily moved over the roughest ground. Incorporating maximum blowing ability, they permit fast, accurate drilling.

For complete information on this time-saving equipment, write Gardner-Denver Company, Quincy, Illinois.



GARDNER-DENVER



Since 1859

*What a mine foreman
told us about
SCHRAMM
AIR COMPRESSORS*

"We like Schramm Air Compressors because they're versatile. That's the important thing in coal mine operations!"

A mine foreman in West Virginia was talking. He rattled off ten or twelve uses to which they put Schramm, starting with rock drilling and ending with cleaning machinery. That, he said, was why Schramms were so useful in his mine operations.

Do you need a compressor that can furnish all the air you want—for any job you have to do? Then turn to Schramm. Lightweight . . . rugged . . . compact . . . they're features you'll like in a Schramm. Write today for descriptive data.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

"were coal mines and coal-mining facilities in the possession of the United States."

U. S. District Judge Albert W. Johnson issued warrants for the accused and James E. Ruffin, special assistant to the U. S. Attorney General, who directed 75 witnesses to appear before the grand jury, pointed out that conviction under the Smith-Connally Act provides for a maximum penalty of one year imprisonment or a \$5,000 fine or both.

A federal grand jury indicted eight Northumberland County (Pa.) miners June 13 at Williamsport, Pa., on charges of coercion in connection with labor stoppages at the government-controlled operations of the Raven Run Coal Co., Mt. Carmel Township.

N.C.A. Scans Coal Developments

A resolution to the effect that National Coal Association officers request the War Manpower Commission to exert itself to the limit toward obtaining additional men for work in the bituminous coal mines and urge upon the Commission the necessity for abstaining from discrimination between mines in furnishing men for such work and specifically request that in its recruiting work no attempt be made to induce men to leave coal mines for work in other mines or in other industries was passed at a meeting of the board of directors of N.C.A. June 21 at the Cleveland Hotel, Cleveland, Ohio. The directors' action was based on the assumption that demand for soft coal this year will exceed output by 30 to 35 million tons and that operators need 50,000 more men for work in and around the mines.

The work of the association with reference to the manpower shortage and its handling with Selective Service and the War Manpower Commission received attention also in the report of Secretary John D. Battle, who noted that 36 new members had been added since last October, representing about 10,000,000 tons of coal, and explained recent changes in bulletin services for the convenience of members. The problem of obtaining equipment and supplies through priorities came in for consideration and the work of this department and its meaning to members was explained. In considering transportation, the work of the railroads in handling coal was highly commended. In connection with the work of the tax committee it was stated that it would be called into session soon to consider a number of matters of interest to the industry in the next tax measure to come before Congress.

Referring to the Federal Power Commission's action in denying the Memphis Natural Gas Co.'s application to build a natural-gas pipeline, it was pointed out that N.C.A. had handled 12 to 15 such cases in the last few years. The board approved a report by Charles A. Owen on a retirement plan for employees and named a committee to work out details.

In outlining the work that the Bituminous Coal Institute is doing and hopes to do, J. P. Williams Jr., chairman of its

WILL THIS LOAD MAKE FRIENDS ?



TREAT IT WITH CALCIUM CHLORIDE AND BE SURE!

A load of dusty coal will lose friends and customers, but you can be sure of making friends with coal made dustless at the mines with Calcium Chloride.

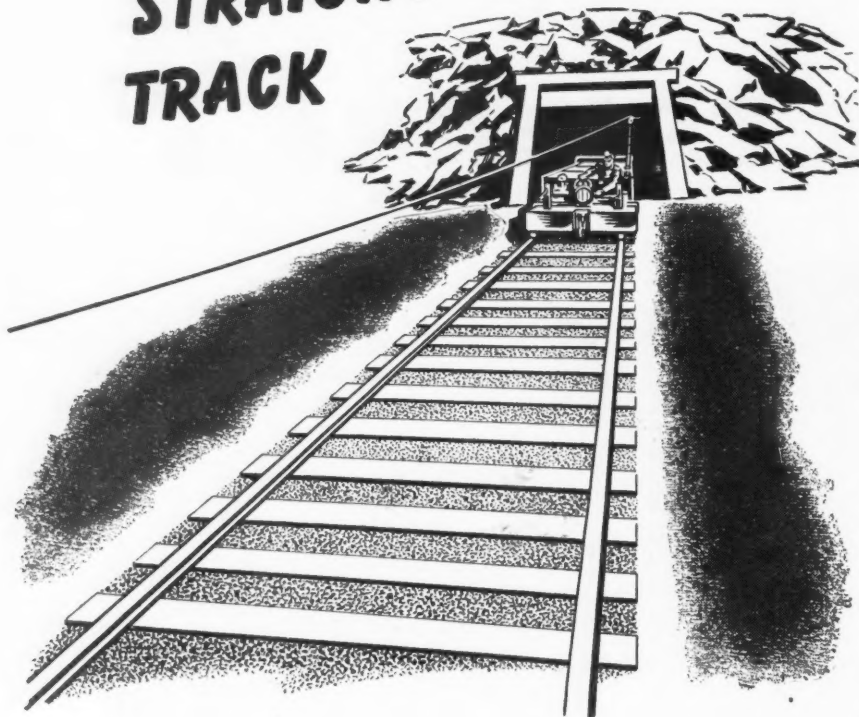
Proper Dustproofing now, when so many suppliers are indifferent, will pay off with a long line of customers who will stay with coal because they like it.

Calcium chloride has been used for years, by many of the leading mines, for dust-proofing and freeze-proofing coal. They have found it effective and economical and have pleased thousands of users with their dustless coal. Our Bulletin No. 37, "Dust-proofing and Freezeproofing Coal," tells how to insure customer satisfaction. The bulletin will be sent on request.

CALCIUM CHLORIDE ASSOCIATION, 4145 Penobscot Building, Detroit 26, Mich.

**DUSTPROOF COAL AT THE MINES WITH
CALCIUM CHLORIDE**

They Roll Better on STRAIGHT-JOINTLESS TRACK



You know what happens when main haulage track begins to get out of line. Cars and locomotives start swaying...there's traction loss and spillage.

But when this same track is converted by Thermit welding into long, continuous stretches of jointless rail it stays straight as a die.

Battered, chipped rail ends are eliminated...rolling stock runs smoother, with less wear and tear, and there's a maintenance reduction of approximately 45%.

But that's not all!

Thermit welding of rail joints results in lower power consumption, since the weld has the same conductivity as the track itself.

You'll also find the Thermit process a handy maintenance tool. Broken axles, crankshafts, and similar heavy equipment can be dependably restored to service quickly and economically.

Write today for your copy of "Continuous Rail for Main Haulage Track."

METAL & THERMIT CORPORATION

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ALBANY • CHICAGO • PITTSBURGH • SO. SAN FRANCISCO • TORONTO

Specialists in welding for nearly forty years. Manufacturers of Murex Electrodes for arc welding and of Thermit for rail welding.



policy committee, declared that he felt the industry was faced with problems that made it necessary to go to the public with the facts concerning the industry and acquaint it with the true situation to bring about a better understanding by the public. Mr. Williams urged that every coal producer give consideration to joining in the work of the institute in the interest of the entire industry.

H. N. Eavenson, president of Bituminous Coal Research, Inc., reported briefly on the work of that organization and introduced Dr. H. J. Rose, recently appointed its director, who outlined the work being done and contemplated by B.C.R.

Dr. Boothe, a representative of Western Reserve University, explained that after long and careful study Western Reserve had decided to inaugurate a course of study in technical sales of fuels at Cleveland College, a part of the university. It will be a four-year course designed to educate men to make a profession of salesmanship and will lead to a Bachelor of Science degree. The board indorsed the idea.

COAL ACTIVITY

Bituminous Coal Stocks

	Thousands Net Tons	P.C. Change	
		From Apr. 1 1944	From May 1 1943
Electric power utilities..	14,802	+5.8	-24.9
Byproduct coke ovens..	5,937	-5.5	-39.0
Steel and rolling mills..	758	-0.9	-34.7
Railroads (Class I)....	10,249	+3.6	-22.2
Other industrials*.....	15,134	-5.1	-46.3
Total.....	46,880	.....	-34.8

Bituminous Coal Consumption

	Thousands Net Tons	P.C. Change	
		From March 1944	From April 1943
Electric power utilities..	5,633	-13.9	+2.8
Byproduct coke ovens..	7,929	-2.4	+5.8
Steel and rolling mills..	879	-13.8	-6.2
Railroads (Class I)....	11,204	-7.0	+4.1
Other industrials*.....	12,116	-13.4	-12.8
Total.....	37,761	-9.5	-2.1

* Includes beehive coke ovens, manufactured-gas plants and cement mills.

Bituminous Production

May, 1944, net tons.....	55,220,000
P.c. change from May, 1943.....	+16.4
January-May, 1944, net tons....	265,690,000
P.c. change from Jan.-May, 1943...	+6.1

Anthracite Production

May, 1944, net tons.....	5,837,000
P.c. change from May, 1943.....	+12.4
January-May, 1944, net tons....	27,522,000
P.c. change from Jan.-May, 1943..	+5.4

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Burners
April, 1944.....	2,181	2,129
P.c. change from April, 1943	+12.8	+101.0
January-April, 1944.....	6,704	9,516
P.c. change from Jan.-April, 1943.....	-13.9	+45.1

Index of Business Activity *

Week ended June 24.....	238.8
Month earlier.....	239.8
Year earlier.....	231.8

* Business Week, July 1.

Electric Power Output †

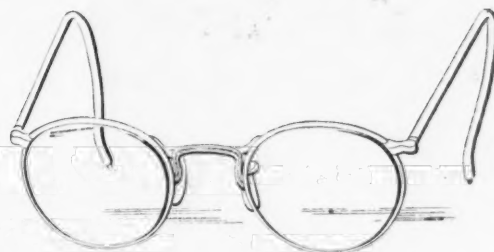
Week ended June 24, kw.-hr....	4,325,417,000
P.c. change from month earlier..	+0.8
P.c. change from year earlier....	+5.0

† Edison Electric Institute.

1 One miner can
produce around
20 tons per day
*... if your machines and
methods are modern*



2 Yet
the slightest eye injury
can cost you his day's
production



3
Be sure your miners
protect their eyes —
and their earnings —
with AO Goggles

4 Call in an MSA
Representative

*Let him show you just how the AO line offers complete
eye-protection ... with scientifically designed goggles for
every hazardous job in your company.*

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SOUTHBRIDGE, MASSACHUSETTS

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+16.4
55,690,000
+6.1

5,837,000
+12.4
27,522,000
+5.4

Oil Burners
Burners
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+101.4
9,516
+45.1

ivity *
238.8
239.8
231.6

25,417,000
+0.8
+5.0

DO POWER FAILURES SABOTAGE YOUR MINE?



THEN PROTECT WITH DELTABESTON

Heat, moisture, oil and grease can keep your maintenance shop busy repairing mine locomotives, loaders, and cutters when they should be in the pits producing more and more coal. Today, coal mines can't afford to take time out for frequent power cable failures. Wise mine superintendents know that the best protection against these ever-present, destruction agents is asbestos-insulated cable. That's why so many mines protect with Deltabeston Apparatus Cable.

Deltabeston Apparatus or Motor Lead Cable is designed for wiring low-voltage apparatus in mines, steel mills, power plants, refineries and other installations where severe operating conditions exist. See above how we fortify Deltabeston with extra protection against destructive agents.

For additional information write to Section Y741-10, Appliance and Merchandise Dept., General Electric Co., Bridgeport, Conn.

Deltabeston Asbestos-insulated Wires and Cables are distributed nationally by Graybar Electric Company, G-E Supply Corp. and other G-E Merchandise Distributors.

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BUY
WAR
BONDS
★

GENERAL  ELECTRIC

Edmundson Seeks To Succeed Lewis.

Ray Edmundson, former president of District 12 (Illinois), United Mine Workers of America, who resigned that office early this year, announced June 14 his candidacy for international vice president of U.M.W. In announcing his candidacy in the election scheduled for Dec. 12 next, he pointed out that two months after the election John L. Lewis, president, who is serving his 13th term in that office, will be 65 years old, at which age the union constitution provides for retirement.

Coal-Gasoline Process In Test in Alberta

A new process for the manufacture of gasoline from coal is to be tested by the Research Council of Alberta. An appropriation of \$60,810 for the Council passed at the last session of the Legislature included a sum for work on the new process, to be carried out in cooperation with the U. S. Bureau of Mines. The new process does not involve a large capital outlay and almost any Alberta coal could be used for the purpose, it is said. As to carbonization, it is stated that large and small tests have been made in Ottawa with high- and low-temperature methods, and small-scale tests have been made in British Columbia.

Absentees Hamper Canada's Output

Nova Scotia coal production is "anything but satisfactory," C. D. Howe, Minister of Munitions and Supply, declared in the Canadian House of Commons in emphasizing widespread absenteeism. "Every ton of coal that can be mined in Nova Scotia is needed," said Mr. Howe, adding that the average output declined from 2.67 tons per man-day in 1939 to 1.72 tons in April of this year. The rate of absenteeism rose from 14.9 percent in January to 29.7 percent in May.

Temporary suspension of sales and deliveries of all hot-air furnaces in Canada and a subsequent limiting of sales to persons holding essentiality certificates was announced June 20 by the Wartime Prices and Trade Board. The certificates are to be available after July 1. "The supply of hot-air furnaces will not meet by a wide margin our over-all requirements for replacements and new buildings," said Donald Gordon, price board chairman. Efforts to increase production will continue, but are hampered by shortages of sheet steel and labor.

Reopening of the Black Diamond Coal Co., Ltd., at Clover Bar, near Edmonton, Alta., started early in June, according to A. C. Dunn, director of the company. It is starting with a staff of about 60, less than are employed in normal times. It has been closed since the shutdown in the Edmonton area on March 31, when operators declared it impossible to operate under an inadequate federal subsidy.

C. A. Hyndman, general manager of

ENGINEER NOW... FOR MINIMUM MAINTENANCE AFTER THE WAR

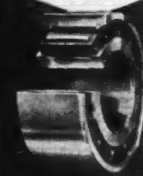
Down-time for repairs! Skilled labor standing idle! Valuable manpower diverted to unproductive maintenance! They're serious problems today, but they'll be worse when war contracts vanish and you're fighting hard for every order.

Insure
Longer Bearing
Life with

ROLLWAY
Right-Angled Loading

Type T
Thrust

Type MUC
Radial



... *So start today.* Engineer both *your product* and *your production machines* for minimum maintenance. Check every bearing ... its life expectancy ... the average number of hours lost through servicing and replacement ... the ruggedness and compactness of the housing ... and the power that could be saved through high-efficiency bearings. Then consider how Rollway's Right-Angled Loading would help you.

Right-Angled Loading Reduces the Unit Load

The advantages of Rollway's basic bearing principle can be seen at a glance: Every radial load is carried at right angles to the roller axis. Every thrust load is carried at right angles to the axis of a separate set of rollers. That means the total load is split into two simple components. The unit load per roller is lower. There are no oblique resultants tending to pinch the rollers out from between the races. Roller-end wear-back is reduced. Rubbing or sliding friction is practically eliminated. Starting torque is lower. Bearing life is longer. And the end result is a noticeable reduction in maintenance.

LET US HELP YOU SELECT THE PROPER BEARINGS FOR YOUR NEEDS

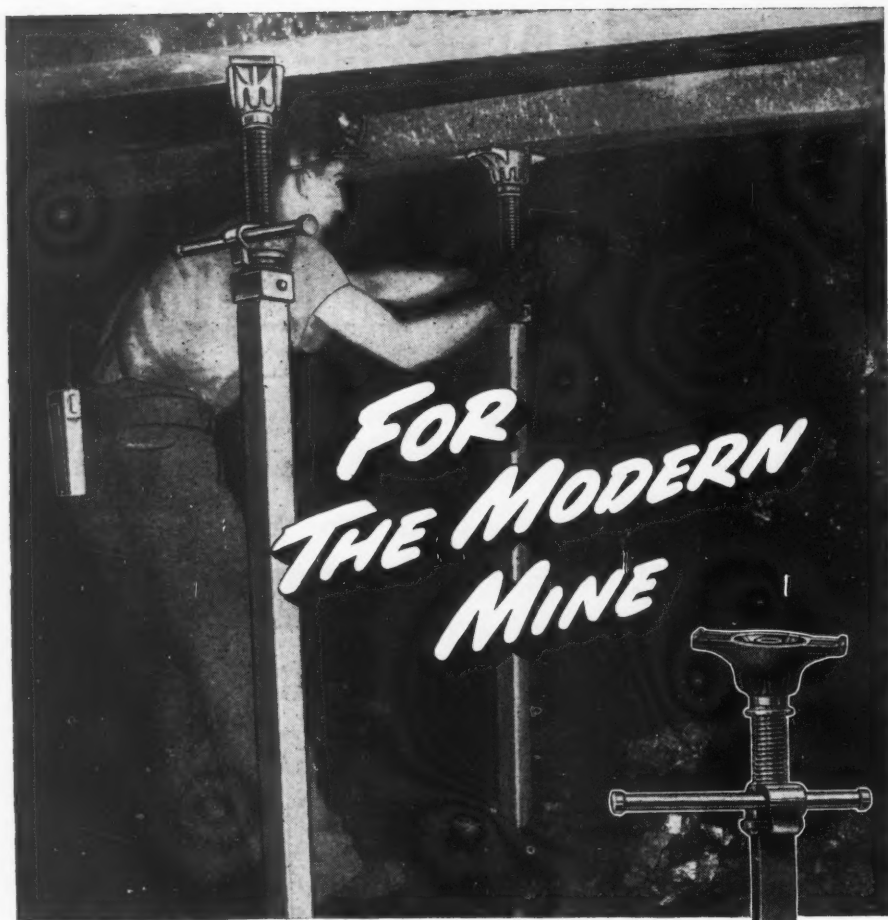
The life of a bearing is not measured entirely by its size, material or precision workmanship. Suitability for the work is an important factor. Let our engineers help you select from the wide range of SAE and American Standard metric sizes. Just send a drawing or detailed description for confidential analysis and recommendation. No charge or obligation.

ROLLWAY

BEARING COMPANY, INC., SYRACUSE, NEW YORK

BUILDING HEAVY-DUTY BEARINGS SINCE 1908

BEARINGS



Duff-Norton Jacks

HUSKY • POWERFUL • SAFE

A wide variety of Duff-Norton Jacks is ready to help you with your heavy lifting, lowering, pushing and pulling, from working face to tippie. Count on these sturdy, easy-operating Jacks for help in your operations. Catalog 202 on request.



"The House That Jacks Built"

THE DUFF-NORTON MANUFACTURING COMPANY
PITTSBURGH, PENNSYLVANIA

Canadian Plant: COATICOOK, QUEBEC • Representatives in Principal Cities

COMING MEETINGS

- Kentucky River Mining Institute: annual meeting, Sept. 22, Hazard, Ky.
- National Safety Congress and Exposition: Oct. 3-5, Sherman, Morrison and LaSalle hotels, Chicago.
- Coal Division, American Institute of Mining and Metallurgical Engineers, and Fuels Division, American Society of Mechanical Engineers: fall meeting, Oct. 23 and 24, Daniel Boone Hotel, Charleston, W. Va.

Dawson Coal, Ltd., said that his mine would not be reopened and dismantling is under way. This operation opened 37 years ago. John Crawford, chief inspector of mines for the province, said there were prospects of other mines in the area reopening.

British Columbia's new legislation regulating coal and petroleum resources is now in effect, creating provincial reserves in some areas while throwing other sections open for prospecting. The new measures are expected to encourage research for coal and oil by outside companies while at the same time protecting the rights of the public against exploitation.

Royalties and conditions of prospecting, drilling and leasing are set forth in the new order, which gives the permittee the exclusive right to conduct geological and geophysical surveys to discover favorable structures. The maximum area to be covered by permit will not exceed 100,000 acres, at a fee of \$250 a permit and a rental of 5c. an acre, rebated if that amount of work is done.

Permits are good for a year and are renewable only if actual development is carried out. Drilling permits also are issued, each to cover 2 square miles, at a fee of \$25 per license and 50c. an acre rental. Licenses are good for a year and if drilling is worth \$7.50 an acre the rental is rebated.

The Coal Act also provides for licenses and leases. A small operator may mine coal up to 10,000 tons a year, the maximum amount of a licensee. If licensee can produce more than that quantity he is given the first opportunity to acquire adjacent ground. To produce more than 10,000 tons a year requires a lease and the operator must apply for one when his production reaches that level. Licensees having a market for more than 100,000 tons a year may obtain more than one license if able to prove existence of the market.

Royalty on coal produced under the new license or lease will be 25c. a net ton, and all mining operations carried on beyond presently active workings must have the approval of the chief inspector of mines, who will call for plans providing for maximum extraction of coal contingent on good mining practice and safety of operation.

Operators will not be permitted to abandon an area in favor of another until they have taken out a maximum quantity of coal. No crown grants are permissible.



This is **Tuffy**

A "tough" character... symbol of the toughness you must have to steady your machine and line performance, to save time and prevent accidents. "Tuffy" stands for *union-formed* (pre-formed) wire rope and that means Tuffy Can Take It, regardless of load or strain.

Specify Tuffy *union-formed* and have the assurance of wire rope with longer life... rope easier to handle because its flexibility is "built-in" during pre-forming... rope that doesn't porcupine or ravel, that doesn't kink, spin or twist, and that spools better on the drum. Get acquainted with Tuffy for smooth-running performance and reduced expenses.

Tuffy ends for mining machines are union-clipped for easier installation.

HI-44



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of Team-work with
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Wire Rope



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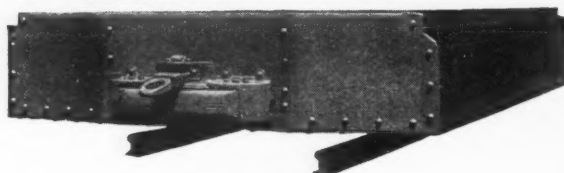
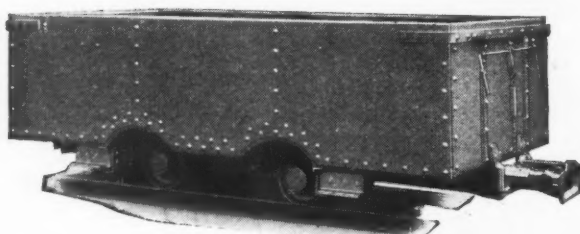
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PRE-FORMED

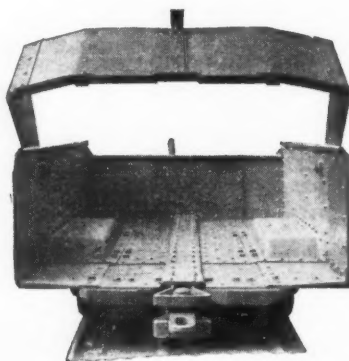
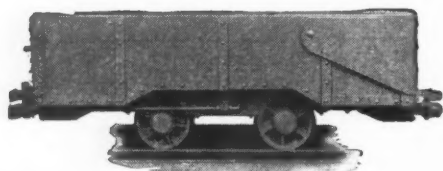
Dependable MINE CARS

Steelcar

TO MEET
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Modern steel cars that provide increased capacity with the best ratio of live load to dead weight. Designed and built to meet your specific clearances and requirements.



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"Designers and Builders of Railway Cars Since 1898"

PRESSED STEEL CAR COMPANY, INC.
INDUSTRIAL DIVISION
PITTSBURGH, PA.

Chemical Workers Join Miners' Union

Atmospheric Nitrogen Corp. officials, at Henderson, Ky., have signed a contract with the United Mine Workers of America affecting 300 workers, according to Earl Suver, organizer for District 50 at Madisonville, Ky. Under the contract, which became effective immediately on signing, said Suver, the employees are assured seniority rights, maintenance, check-off and compulsory arbitration.

Coal Publications

Safety Blasting Practices in a New York Quarry, by N. King and A. D. Look, U. S. Bureau of Mines. R. I. 3752, 12 pp., 8x10½ in.; mimeograph; paper.

Development and Use of Certain Flotation Reagents, by R. S. Dean and P. M. Ambrose, U. S. Bureau of Mines. Bulletin 449, 79 pp., 5½x9½ in.; paper.

Possible Hazards Attending the Use of Engines Operated on Butane Fuel in Mining and Tunneling, by L. B. Berger and H. H. Schrenk, U. S. Bureau of Mines. I. C. 7248, 6 pp., 8x10½ in.; mimeograph; paper. In underground mining and tunneling, operation of internal-combustion engines with butane as fuel is regarded as unsafe by the Bureau.

Application of Overfire Jets, by R. B. Engdahl, Battelle Memorial Institute, for Bituminous Coal Research, Inc. Technical Report No. 7; 18 pp., 6x9 in.; paper. Proper use, shape, size, location and silencing of overfire air jets for furnaces. Also as insert reprint *Design Data for Overfire Jets*, 5 pp., 8½x11 in.; paper.

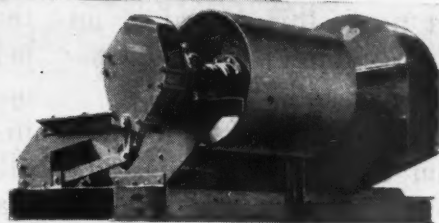
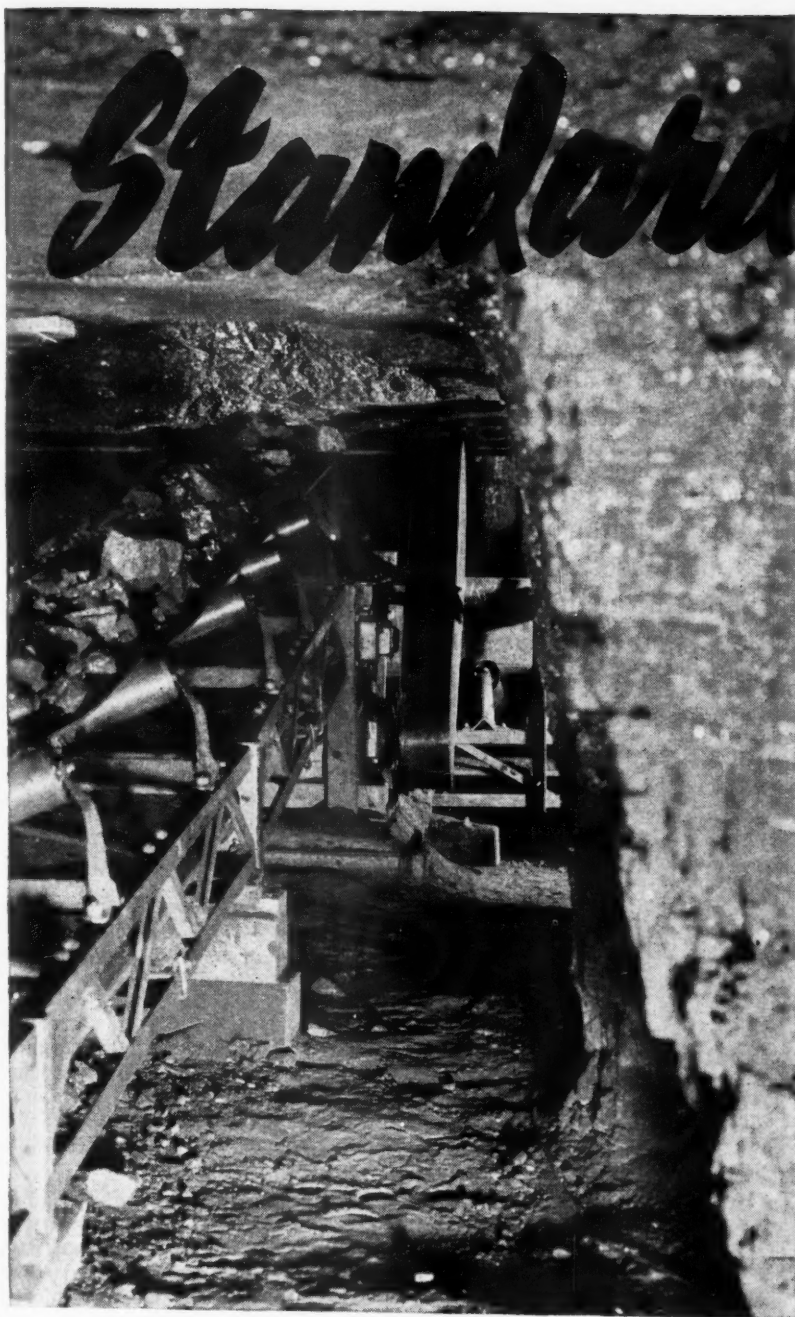
Anthracite Mine Fires: Their Behavior and Control, by G. S. Scott, U. S. Bureau of Mines. Bulletin 455, 210 pp., 5½x9½ in.; paper. Author thinks that most anthracite fires of undetermined origin arise from other causes than the spontaneous heating of coal. Self-ignition of oily rags or wood may start these fires.

Ground Resistance Measurements of Drillhole Casings, by F. E. Griffith and E. J. Gleim, U. S. Bureau of Mines, R. I. 3756, 8 pp., 8x10½ in.; mimeograph; paper. Tests seem to indicate that drillhole casings need no grounding but furnish a better ground than any grounding rod because of their larger contact surface. Resistance between casing and ground ranged from 0.35 to 4.5 ohms.

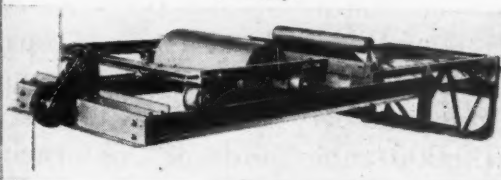
Production, Jobs and Taxes, A Research Study of the Committee for Economic Development, by H. M. Groves. McGraw-Hill Book Co., 116 pp., 5½x9 in.; cloth. Price \$1.25. Postwar revision of federal tax system to help achieve higher production and more jobs. Emphasis placed on a direct personal tax to be measured by all income and paid by large majority of families.

Annual Report of Research and Technologic Work in Coal, Fiscal Year 1943, by A. C. Fieldner, J. E. Beltz and P. L. Fisher, U. S. Bureau of Mines. I. C. 7272,

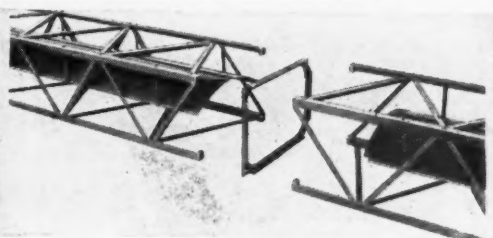
Standardized!



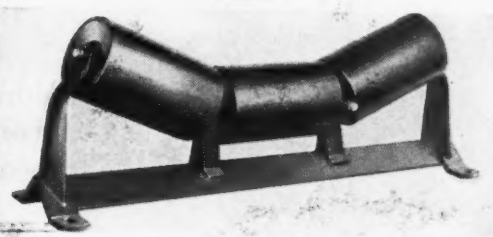
Head end drive with safety backstop.



Gravity type footend takeup.



Standardized truss or channel frames.



Ball or roller bearing carriers.

The B-G method of standardized unit construction provides completely interchangeable and highly flexible equipment for mine conveying systems. Frames are quickly added or removed to alter the existing system. Terminals are factory assembled and arrive ready to bolt to the conveyor frame. The entire system may be removed and installed in another field with complete salvage of all equipment. The B-G Mine Conveyor Catalog 66 gives complete details. Write for your copy. Barber-Greene Co., Aurora, Ill., U. S. A.

44-65

BARBER-GREENE
A U R O R A , I L L . , U . S . A .

14,500,000 Yards of Material Stripped by One Amsco Dipper

The Amsco 15 yd. all manganese steel "Missabe" dipper that made this record in an Illinois mine is shown in pictures 555 and 592.

The overburden at this operation consisted of 35% siliceous limestone and argillaceous matter of more than average hardness; and 65% southern Illinois clay and shale.

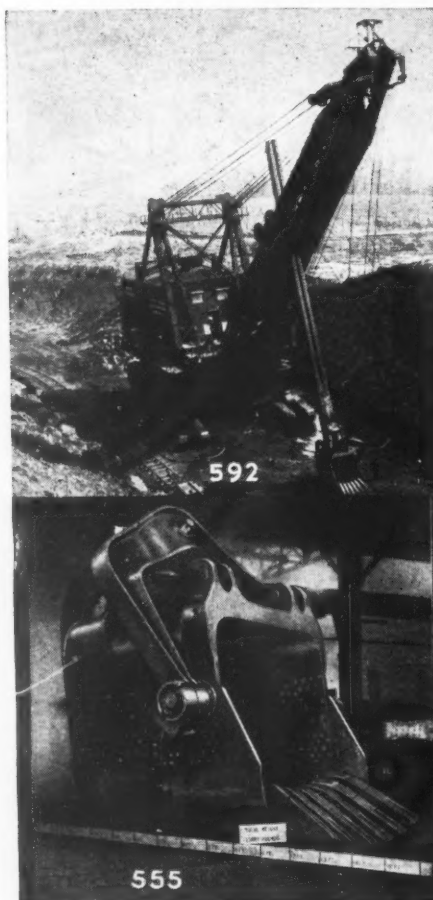
During a five year period the Amsco dipper handled 14,500,000 cubic yards of this abrasive material. It was designed to meet unusually diffi-

cult conditions at the particular location and was heavier than is necessary for efficient performance on most other operations. At the time of its installation, it was the largest all manganese steel dipper made: 14' high, 12' wide and weight, empty, 37 tons.

Records, including ordinary repairs, tooth bases and tooth points, showed a maintenance cost of less than a dollar for each 1000 cubic yards of stripped overburden.

Another Amsco manganese steel 15 yd. coal stripping dipper, this one of the renewable lip type, is shown in R-536; one of a number of this design, in various sizes, now working in Indiana and Illinois mines.

Bulletin 743-M, "The Toughest Steel Known for Mining Equipment," describes many more Amsco dippers used in mining operations.



Send for Bulletin No. 941-W on Amsco Conservation Welding Rods.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois

FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN

Brake Shoe

COMPANY

77 pp., 8x10½ in.; mimeograph; paper. Rock dust does not cause decay or weaken timber; crushing strength after 18 months was 40 to 54 percent for oak, 54 to 75 for hickory, 57 to 73 for maple and not more than 21 for locust. The exhaust of diesel locomotives has one to five times as much of nitrogen oxides as of carbon monoxide. With rubber-tired equipment, power consumption is at a maximum. Sheathing explosives with fire-quenching material increases quantity of nitrogen oxides but does not affect carbon monoxide evolution. Paint has been used successfully to protect the mine ribs in the Suntrana mine in Alaska against crevicing and spontaneous combustion. In a hunt for electrode carbon, 5-in. Straight Creek lump coal from Bell mine, Bell County, Kentucky, originally 0.77 percent ash, was cleaned to 0.65 percent by the Trent process. Subbituminous coal, stored 4 ft. deep within walls, slacked for 2 in. on top but did not fire. Results of studies in steam generation, carbonization and hydrogenation complete this circular.

Accidents to Children From Blasting Caps, by D. Harrington and R. G. Warneke, U. S. Bureau of Mines. I.C. 7275, 13 pp., 8x10½ in.; mimeograph; paper. Gives many examples of accidents to children from this cause during 1943, and urges more care in keeping children from getting such caps and teaching children at school and elsewhere to recognize and avoid them.

Some Suggestions on Care in the Use and Handling of Explosives in Coal Mines, by Lloyd G. Fitzgerald, U. S. Bureau of Mines. I.C. 7278, 7 pp., 8x10½ in.; mimeograph; paper. Proper storage saves explosives as well as protects lives of miners and public. Adobe shots and unconfined shots will ignite gas or dust even if permissible powder is used. With Cardox, shotfirer should protect himself by hiding behind two right-angled corners.

Standardized Construction of Mine Ventilating Doors, by J. C. Hartley and A. C. Moschetti. I.C. 7280, 5 pp., 8x10½ in.; mimeograph; paper. Describes and illustrates Glen Alden Coal Co. door at South Wilkes-Barre, Pa.

British Joint Production Machinery. International Labor Office, 2480 University St., Montreal, Canada. 273 pp., 6½x9½ in.; paper. Price, \$1.25. Explains employer-worker participation in the organization of production, whether national, regional, by district and at the factory.

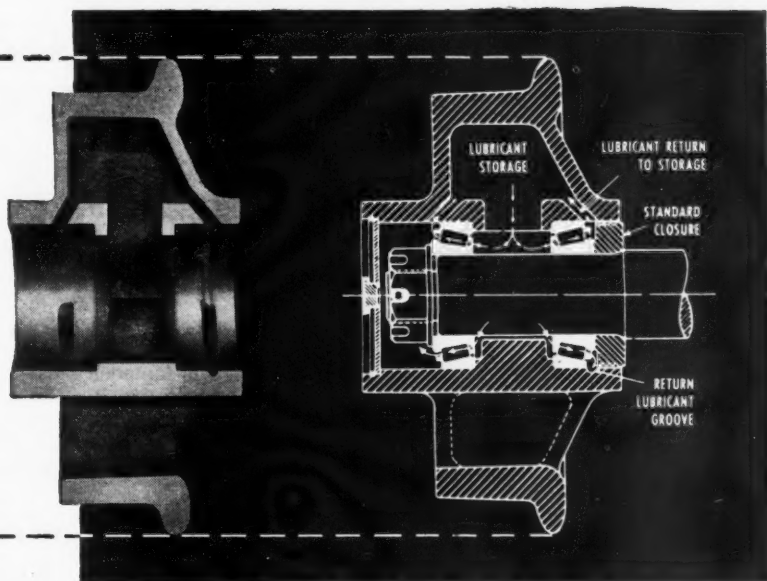
Loss of Life Among Wearers of Oxygen Breathing Apparatus, by G. W. Grove, U. S. Bureau of Mines. I.C. 7279, 26 pp., 8x10½ in.; mimeograph; paper. In this country, 26 men have been killed while wearing such equipment, 5 employees of the Bureau of Mines; all but one occurring where work was not conducted in accord with today's recognized requirements. The one exception was a man with a defective heart.

A Safety Color Code for Industry. E. I. duPont de Nemours & Co., 13 pp., 11x8½ in.; paper. Describes method in which colors are used as visual aids to safety; explains also "three-dimensional seeing."

COSTS SAVED—BECOME PROFITS

The wheel with a
built-in oiling system

ON THE JOB IN ANY KIND OF WEATHER



FREE-FLOWING, positive lubrication at the first turn of the wheel, under all temperature conditions—based on a unique principle of automatic lubrication—makes "Oilspok" Wheels the most profitable car wheels you can use. They give longer service and more satisfactory performance at lowest maintenance and labor costs.

Each spoke has three ports leading into the hub—one large central port and two narrow rectangular ports located at the outside of each bearing. The lubricant passes readily through the large central port to the bearings and is then thrown back through the rectangular ports by centrifugal force to the storage reservoirs. Each time the wheel stops, bearings get sufficient oil to last several days, and excess goes back to reservoir, eliminating churning resistance. Any type oiler can be furnished.

"Oilspok" Wheels can be made to fit your present axles. They are made with both standard and labyrinth enclosures, and for plain and roller bearings. Wheel design permits "spragging" like standard spoke wheels.

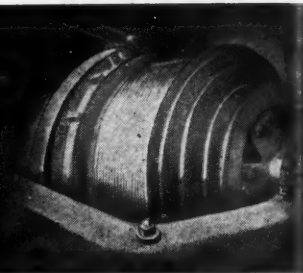
Save wheel costs. Use "Oilspok" Wheels. Write for full information. HOCKENSMITH WHEEL & MINE CAR COMPANY, Established 1877, Penn, Pa., Phone—Jeannette 700.

"OILSPOK" WHEELS WILL—

- 1. Increase Wheel Life.** Excessive tread wear—caused by the churning resistance of heavy greases—is eliminated. Free wheel rotation.
- 2. Save Power.** Free wheel rotation means no power lost by churning grease. The lubricant in the "Oilspok" wheel is fluid and free flowing.
- 3. Save Lubricant and Lubricating Labor.** "Oilspok" lubrication is positive and continuous—no loss due to bearing pumping pressure or air expansion. One greasing lasts several years—less labor cost and loss of car service.
- 4. Give Longer Bearing Life.** Bearing lubricant is constantly changed—bearings clean and cool—constant circulation maintains lubricant in better condition.
- 5. Increase Axle Box Life.** "Oilspok" wheels are free turning under all temperature conditions—no chance of axles turning in dry boxes.
- 6. Eliminate Disadvantage of Small Diameter Wheels.** Higher hub resistance—a characteristic of small diameter wheels with large bearings—is substantially reduced in "Oilspok" wheels with their positive, circulating fluid lubrication.
- 7. Provide Stronger Wheel—No Extra Weight.** "Oilspok" wheels have tapered box-section spokes—the strongest possible construction for resisting side thrust and vertical loads. Same weight as standard wheels for various bearing and axle sizes.

Hockensmith "Oilspok" Wheels

TIPS FROM MANUFACTURERS

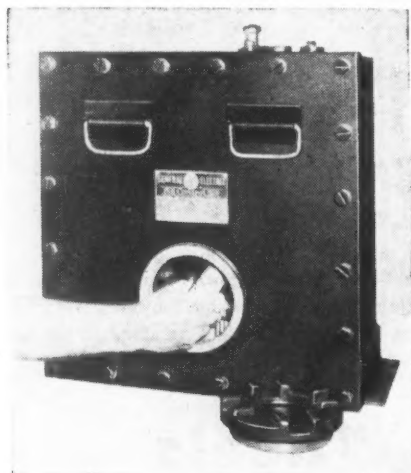


Spot Welding Timer

Suitable for welding small objects of high conductivity such as aluminum or copper, a new precise welding timer—SP-18—with heat control for timing intervals of one-half cycle or less is announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The timer is furnished as a separate control for use with existing small bench welders and also in combination with a small welding transformer. Only one central tube is used, this thyatron serving the dual purpose of rectifying alternating current to charge a firing capacitor and also firing the small ignitron power tube. Heat control is accomplished by a phase shift method, the adjustment dial for which is mounted on the cabinet door.

Starters

A new line of a.c. full-voltage explosion-proof starters for use in gaseous mines is offered by the industrial control division of the General Electric Co., Schenectady, N. Y. Especially designed for use on equipment subject to inspection by the U. S. Bureau of Mines, such as face conveyors, room conveyors and similar mining equipment, the starters are available up to 50 hp. in the reversing type and up to 100 hp. in the non-reversing type; are housed in heavy explosion-proof inclosures fabricated of steel plate. In addition the wide flange between the cover and the body of these inclosures is ground to close tolerances to prevent the escape of burning gases. Access to the line fuses is facilitated by a hand-hole cover equipped with an inspector's seal.



The switches, contactors and overload relays of these starters are of the heavy-duty type characteristic of such equipment and are designed and located to permit a considerable variety of magnetic interlocked control arrangements. The starters are furnished with simply assembled bell-mounted packing glands to match the size of the cable to be used. If required, a cable-retaining clamp also is furnished with each starter.

Lens Cleaner

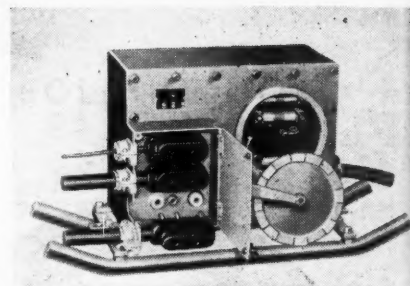
Brite-Ize Co., Chicago, has developed a simple system for cleaning goggles, glass-faced dials, microscope and inspection lenses, etc. in industrial plants. Included in the system are: (1) hermetically sealed ampoules of Brite-Ize concentrate, each of which when mixed with distilled water makes a full gallon of Brite-Ize lens cleaner, and (2) Brite-Ize cleaning-station dispensers.



Brite-Ize is a specially compounded detergent that is said to remove fog, grease, grime and splatter instantly; leaving no halation and not injuring rim plating, leather, fabric or rubber mountings. The dispensers are of the pressure type, charged with air, either from any standard (50-lb.) air line or with a small hand pump. At the touch of a lever they release Brite-Ize in a fine mist spray.

Distribution Box

Ohio Brass Co., Mansfield, Ohio, has developed a new explosion-proof power distribution box for use in underground working areas. Known as the O-B Type L.G. gasproof multiple distribution box, the device is designed to handle power connections for all mechanical equipment in a room and facilities are provided for



three circuits. Each is individually fused, two at 250 amp. and the third at 30 amp. It has been tested and approved by the U. S. Bureau of Mines.

Power connections are made through triple-pronged rubber plugs which fit into corresponding sockets in a plug box located on the front cover of the device. Current is carried into the plug through insulated plastic bushings, color-coded in accordance with the recently adopted color code. Both plug terminals and sockets are silver-plated to provide low contact resistance and are arranged to prevent hook-ups of improper polarity or to the wrong circuit.

A fuse panel is located on the inside of the cover and may be reached for fuse renewals through a large screw-type hand-hole. Both the handhole cover and plug-box lid are interlocked with the power disconnect switch to prevent access with power "on."

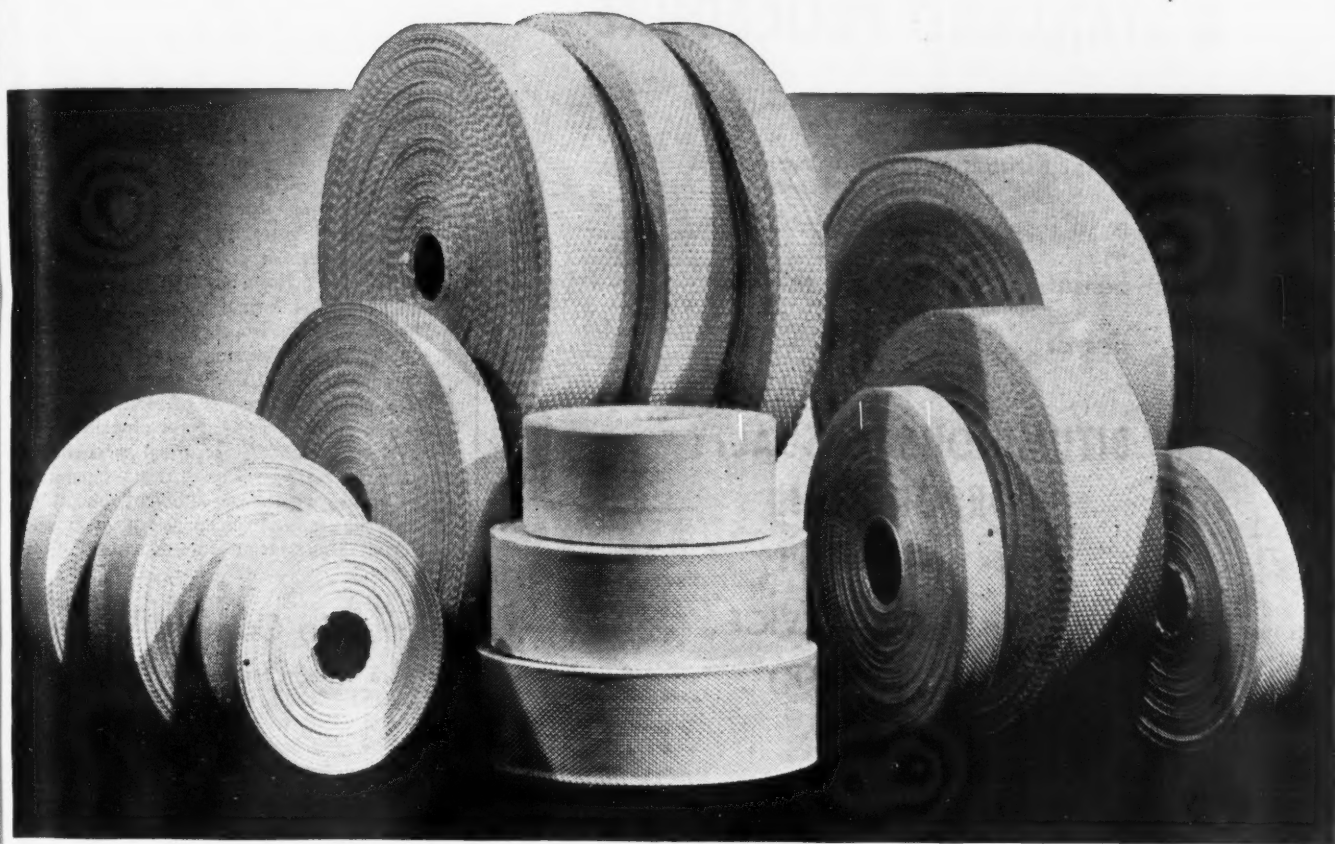
The device is inclosed within a welded-steel case and all internal mechanism is mounted on the inside front cover, making it readily accessible for inspection or maintenance. Hauling eyes are provided to facilitate movement as the face advances and the unit is skid-mounted for portability.

Conveyor Belts

To help mines get more service and efficiency from conveyor belts, Good-year Tire & Rubber Co., Akron, Ohio, announces a new coal-belt line featuring a material to delay deterioration from sulphuric or other acids encountered in underground operations. A "troughing index" has been adopted to provide advance selection of mine belts neither too limber nor too stiff for this service, and impact indices have been established on a quantitative, inch-pound basis for all kinds and classes of belting.

Much of the company's mine belt sold as long as six to eight years ago, according to W. C. Winings, mechanical goods

AVAILABLE NOW...



FIBERGLAS* TAPES TO MEET EVERY WINDING NEED

An extraordinary combination of inherent qualities makes impregnated Fiberglas Tape a better insulating material. Fiberglas-insulated motors—operating under conditions of high ambient temperatures, high humidity, overloads, or in the presence of acids, oils and corrosive vapors—last longer, require rewinding less often, are more economical.

Fiberglas Tapes are produced in all standard widths—from $\frac{3}{8}$ " to $1\frac{1}{2}$ "—and in thicknesses from .003" to .015". All of these sizes are available now!

This range of widths and thicknesses permits the rewinding of motors with Fiberglas regardless of previous insulation used.

Because Fiberglas is glass, Fiberglas Tapes

provide an inorganic insulation of exceptional value in electrical applications.

The individual glass fibers are nonhygroscopic—a property of major importance in many electrical applications.

Some of the other superior benefits Fiberglas Tapes offer are: great tensile strength; high temperature resistance; high dielectric strength and insulation resistance when combined with appropriate varnishes or impregnants.

For full information or samples of the complete line of Fiberglas Electrical Insulation, consult your distributor or write *Owens-Corning Fiberglas Corporation, 1862 Nicholas Bldg., Toledo 1, Ohio. In Canada, Fiberglas Canada, Ltd., Oshawa, Ontario.*



FIBERGLAS

*T. M. Reg. U. S. Pat. Off.

...A BASIC MATERIAL

YARNS • TAPES • CORD • SLEEVING • CLOTH AND OTHER FORMS

A STANDARD PROCEDURE

with a large majority of the country's bituminous coal operators is to insure their workmen's compensation risks through the facilities of

BITUMINOUS CASUALTY CORPORATION

ROCK ISLAND, ILLINOIS

27 YEARS OF SERVICE
TO THE INDUSTRY

HOW TO CUT MAINTENANCE COSTS

Don't make the mistake of thinking all bearing materials are alike. When you specify Promet you are assured of a specific formulae designed to best serve each specific requirement and application. . . Specializing in bronze bearings and bushings for coal mining equipment, we can give a money-back guarantee of superior service with our product. . . Machinists prefer Promet bar stock (cored or solid) because it machines easily. Rounds, hexagons and squares, in rough cast, semi-finished, or fully machined. Cored bar stock available in all sizes (by $\frac{1}{4}$ " steps) from a $\frac{1}{2}$ " minimum core to 12" O.D. and 12' lengths. There's a Promet Bronze Formulae for your every requirement. . . Parts for Jeffrey, Goodman, Westinghouse, General Electric, Sullivan, Joy Equipment, etc.

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descriptive booklet**



THE AMERICAN CRUCIBLE PRODUCTS CO.
1307 Oberlin Ave., Lorain, Ohio, U. S. A.

Prompt deliveries can usually be made from stocks maintained at:
BECKLEY, W. Va., The Universal Supply Co., Corner 2nd Ave. and 2nd St. Phone 3642
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Other Representatives

ALTON, ILL., Frank E. Rhine, 623 Blair Ave. Phone Alton 3-8629
BIG STONE GAP, VIRGINIA C. P. Cawood
BIRMINGHAM 1, ALA., O. O. Lindstrom Equipment Co. P. O. Box 103
CANTON, OHIO, Bowditch Company, Waynesburg Road. Phone 79-808
MT. LEBANON, PA., J. E. Nisner, 720 Roselawn Ave. Phone Pittsburgh 9576
DENVER, COLO., Drumhart Service, 16th Street at Blake Phone Main 6311

division manager, is in service still; the "troughing index" and addition of a material to resist deterioration from acids, however, are new developments in this field, he said.

Terminal Strip

To meet the demand for a barrier type terminal strip with facilities for connections both above and below the mounting surface, Howard B. Jones Co., 2460 West George St., Chicago 18, Ill., offers the "Y" type terminal which mounts on its standard barrier strips and permits a screw connection above the panel and a solder connection below.

The "Y" terminal mounts securely in the block and also is held by the screw so that the connecting wire comes in direct contact with the terminal. The heavy Bakelite body is of BM 120 compound according to Navy specifications 17P4 and the "Y" terminal is made of brass, tin-plated. The barriers separating the terminals are of sufficient height to give the desired creepage distance and prevent shorts from frayed wires.

Remote Control Valve

Grove Regulator Co., 6477 Green St., Oakland 8, Calif., offers the Flexflo remote control valve, which is said to represent a distinct and radical departure from conventional types of valves in design, construction and operation. Identified as an "expandable-tube type" valve, it operates by manual or automatic remote control on the hydraulic principle of balanced and unbalanced fluid line pressure.

Designed for cold fluid service, these new valves are said to be especially suited for handling water, salt water, chemical solutions, oil, gases and air. Due to the fact that they utilize just one non-metallic operating part, they are extremely resistant to corrosion and erosion as well as electrolytic action and are automatically self-compensating for wear.

Their simplified assembly consists of but four parts: the valve body, the flange head, a slotted pipelike core with a solid barrier in the center, and a cylindrical flexible tube. The Flexflo valve employs no seats, disks, springs or weights and has no packing gland, stuffing box or exposed members. Full details given in Bulletin 800.

Headlight Switch

Mosebach Electric & Supply Co., 1115 Arlington Ave., Pittsburgh 3, Pa., has developed a new 275-volt d.c. headlight switch for mine locomotives which the manufacturer asserts is practically indestructible under severe mine conditions.

This new rotary-type reversible switch is completely inclosed in an explosion-proof case. The switch itself is made of Mesco metal and has two non-sparking mercury tubes, one each for the forward and reverse positions. The metal case is provided with a double seal, making the switch flameproof.

Designated as Cat. No. 2301, the switch

FROM BLUEPRINT TO PRODUCTION ...

FAIRMONT

HAS THE FACILITIES, INGENUITY AND
EXPERIENCE TO ASSUME UNDIVIDED
RESPONSIBILITY IN DESIGNING AND
EQUIPPING A PREPARATION PLANT FOR YOU.

CHANCE SAND FLOTATION SYSTEM
for Wet Cleaning

AMERICAN PNEUMATIC SYSTEM
for Dry Cleaning

• Do your operations require a Wet or Dry Cleaning Process . . . or a combination of both? FAIRMONT stands ready to assume complete responsibility for the design and equipment of preparation plants to meet the specific requirements of your coal. Maintain positive control over every phase of preparation, from mine feed to railroad car, with a FAIRMONT-designed

Preparation Plant . . . get maximum benefits from washing, cleaning, sizing and blending operations.

Call in FAIRMONT Engineers now for help in designing your new preparation plant . . . or if you are planning on rejuvenating your present plant FAIRMONT will help you re-design to produce more and better coal.

TRADE MARK REGISTERED

FAIRMONT MACHINERY COMPANY

FAIRMONT, W. VA.

{ dustproof coal TODAY for sales leadership TOMORROW }

"CLEAN" coal tells its own story to dealers *and* householders . . . of fuel handled with virtually none of the dirt, dust and sifting, clinging *soil* that so often makes other kinds of fuel look more desirable.

Wyandotte Calcium Chloride does just that for you—it *dust-proofs* coal, giving it a special, *new* sheen that stamps it as clean . . . and gives it a *sales appeal* that no other treatment can.

When the present emergency is eased, competition again will put some in the lead—and leave others trailing. So why not plan *now* to be a leader? Dustproofing your coal today means the inside track

to satisfied customers and better business *tomorrow*!

Write for information on Wyandotte Calcium Chloride—the safe, *reliable* agent for dustproofing coal.

Wyandotte Chemicals Corporation
MICHIGAN ALKALI DIVISION
Wyandotte, Michigan

Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

Name _____
Address _____
Title _____



Wyandotte
REG. U. S. PAT. OFF.

CALCIUM CHLORIDE

WYANDOTTE CHEMICALS CORPORATION • MICHIGAN ALKALI DIVISION, Wyandotte, Michigan

*5 reasons why
AMERICAN BRATTICE CLOTH
is the logical choice
for your operations*

- It is impervious to flame, fungi and shrinkage.
- It is closely woven, of highest grade materials, to reduce air leakage to a minimum.
- The surface is smooth . . . not easily damaged by passing cars or machinery.
- It may be moved many times . . . used over and over.
- It is easy to install, and once installed requires no maintenance.

Write today for complete information on AMERICAN Brattice Cloth.

Our large factory stocks enable us to make prompt deliveries on your orders.

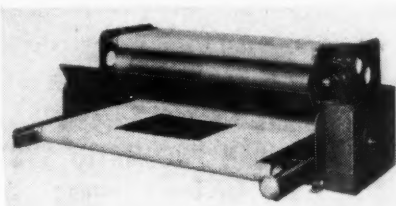
**THE AMERICAN BRATTICE
CLOTH CORPORATION**
WARSAW • INDIANA



is used for operating both front and rear lights separately. The switch is thrown to the right to turn front light on and to the left for rear light. Center position turns both lights off. Additional information concerning this switch will be found in Catalog 44.

Print Dryers

For over-all drying of blueprints or black and white prints Peck & Harvey, 4327 Addison St., Chicago 41, Ill., has produced a compact electrically heated dryer in two sizes—handling prints of 26 and 44 in. widths. In addition to standard heat regulation as provided the B-8 dryers also are equipped with variable-speed-drive motors and controllers, permitting instantaneous speed changes over a range of 6 in. to 3½ ft. a minute.



Pressed-steel framework, specially woven seamless band, heavy seamless copper revolving drum, steel-clad refractory insulated Nichrome heaters, nickel contacts and asbestos-insulated pickle wire are used, forming a long-lived heating and control unit.

Hose Coupling

A detachable brass coupling for helical flexible metal hose in sizes from ¾ to 1½ in. inside diameter has been developed by Packless Metal Products Corp., New Rochelle, N. Y., offering the advantage of being mechanically self-sealing. No brazing is employed; no heating of the hose to weaken it at the point where flexing and vibration place the greatest strain on the hose.

A further design feature is the self-contained union which permits the pipe



25 Yards at a Time . . .

● That's the way the Northern Illinois Coal Corporation—one of the nation's larger coal strippers—removes overburden from its fields near Wilmington, Illinois.

Having achieved outstanding results with Page Automatic Dragline buckets, this Midwest firm has now standardized on Automatics and has in use

5, 8, 12, 14 and two 25 cubic yard Page buckets, one of which is shown above.

These giant Automatic buckets proved more than a match for extra-tough overburden sometimes in excess of 80 feet deep, and produced yardage way beyond what was thought to be dragline possibilities with greatly reduced maintenance and operating costs.

PAGE

Automatic DRAGLINE BUCKETS

PAGE ENGINEERING COMPANY, CHICAGO 38, ILLINOIS

One-half of air pumped never reaches the face — You can better that percentage at your mine with—

MOROPA

COTTON BRATTICE CLOTH

This is no time to risk production losses through faulty ventilation . . . MOROPA COTTON BRATTICE CLOTH, as proved in the mines of many leading producers, is the soundest choice for the safety that allows you to boost vital production.

A careful examination of MOROPA'S characteristics reveals the reasons for its acceptance. MOROPA is Flame-Resistant, has low Porosity, Resists Mildew, and gives Maximum Wear.

See data on MOROPA, page 123 of the 1943 Coal Mining Catalog . . . or write us! MOROPA comes in standard widths up to 84 inches. Other sizes special.



...made in America,
of American Cotton,
manufactured by . . .

Act today to eliminate unnecessary ventilation risks
. . . install MOROPA.

JOHN FLOCKER & COMPANY

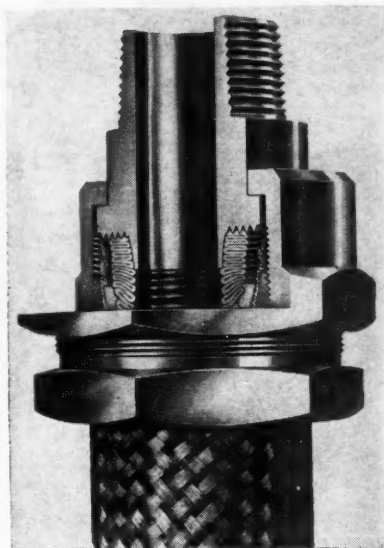
642 GRANT ST.

EST. 1822

PITTSBURGH, PA.



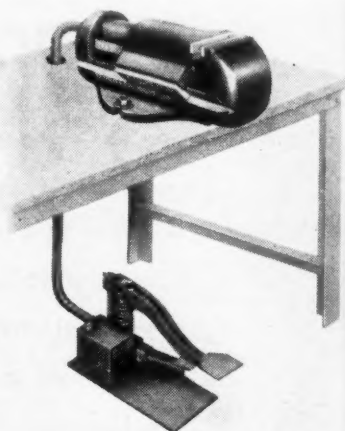
Try the
"Blow-Torch Test"



thread end of the coupling to be screwed directly into the machine fitting and the union tightened without twisting the hose. The coupling has additional advantages of reuse and easy assembly with ordinary shop tools.

Hydraulic Vise

Strength, "V" ways, semi-steel, with precision construction and simplified all-steel hydraulic foot control, are salient features of the new hydraulic vise offered by Reimuller Bros. Co., 9400 Belmont Ave., Franklin Park, Ill. The unit can be mounted vertically and used for a produc-



tion press on small precision upsetting, heading and other small operations requiring dies or tooling. The new vise is portable in that it is equipped with flexible hydraulic hose which lends adaptability to use on other machines. Two sizes are available: 4 ton with 4-in. opening and 7 ton with 7-in. opening.

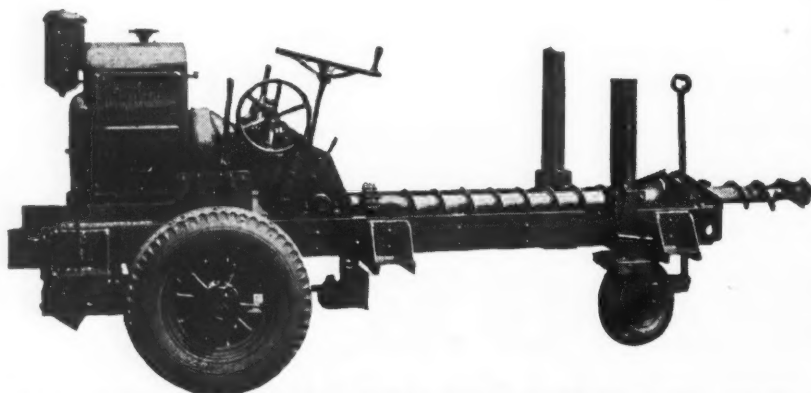
Industrial Notes

METALLIZING CO. OF AMERICA, 1330 West Congress St., Chicago, has appointed Henry D. Engelsman as sales manager and technical service supervisor. Associated with the company for two years as sales and service engineer, he was

PARMANCO Horizontal Drills

"Positive Control Drilling"

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



PARIS MANUFACTURING CO.

PARIS, ILLINOIS

AMERICAN-MADE RUBBER IS RESPONSIBLE FOR THE PRESERVATION OF INDUSTRIAL AMERICA!

● Industry had a faint heart the morning after Pearl Harbor was attacked. The question on all sides was: "What will America do for Rubber?"

The plan of what to do was quickly answered. The United States must have a stock pile of rubber independent of any other country. The plan started immediately... the execution required a little longer... the realization is just about here.

Industry is getting the rubber it needs, due entirely to that ingenuity, the like of which is known and practiced only by Americans. The United States is now definitely "over the hill" as far as the supply of rubber is concerned.

Quaker, with its progressive program has made quite an achievement in turning out Industrial Rubber Products. For years we have been experimenting with, and using, American-made (synthetic) rubber.

Our Laboratory technicians have developed so many applications where American-made rubber is definitely turning out products better suited for their particular task than when made from Crude.

When Quality Belting, Hose or Packings are under consideration, think of Quaker.

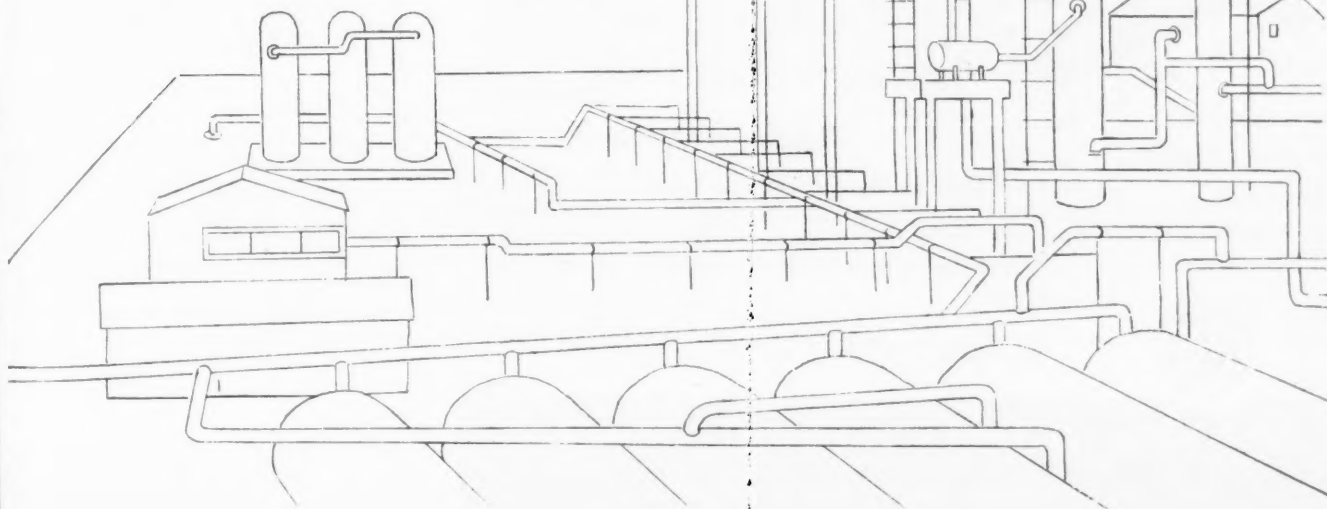
If there is a way to get it done—Quaker will do it!



QUAKER RUBBER CORPORATION

PHILADELPHIA 24, PA.

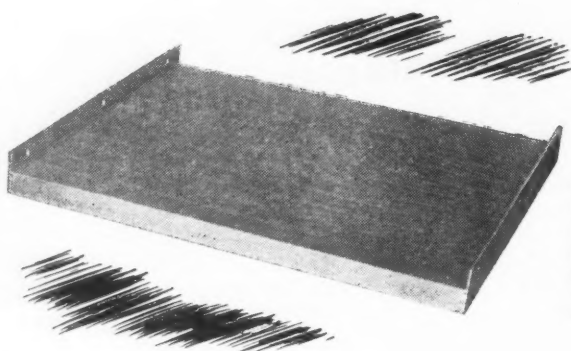
New York 7 • Cleveland 15 • Chicago 16 • Houston 1



upsetting
operations re
new vise is
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ERICA, 1330
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FOR BETTER *Results* AND *Low Cost*
USE **"BEE • ZEE"** SCREENS



★
ALL TYPES
SCREENS

- Chute & Conveyor
- Rigid Panel Vibrator
- Heat Dryer
- Hook-type Vibrator
- Shaker Panel
- Centrifugal Dryer
- Sizing Screen

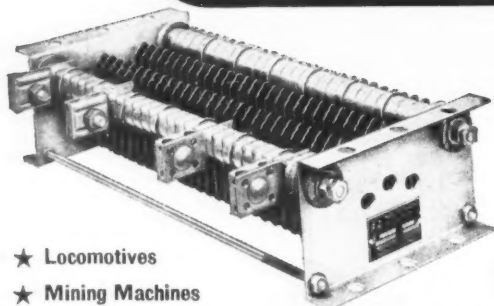
Bixby-Zimmer round-rod screens are tailor-made in many designs for all sizing, dewatering and drying equipment. They're built for long life and efficient screening operation. Take advantage of "Bee-Zee" savings — call or write for information today.



BIXBY • ZIMMER
ENGINEERING CO.
961 Abingdon St. • GALESBURG, ILL.

FOR DURABILITY

Specify P-G STEEL GRID RESISTORS



- ★ ALL STEEL CONSTRUCTION
- ★ MICA INSULATION
- ★ RUGGED TERMINALS
- ★ PROVISION FOR EXPANSION
- ★ ADEQUATE VENTILATION
- ★ UNAFFECTED BY VIBRATION
- ★ MOISTURE RESISTANT
- ★ CORROSION PROTECTED

- ★ Locomotives
- ★ Mining Machines
- ★ Loaders
- ★ Conveyors

Continuous
Trouble-Free *Resistor* Service...

Steel and Mica, the two basic materials entering the construction of P-G Steel Grid Resistors, are the foundation for CONTINUOUS TROUBLE-FREE resistor service. P-G uses these materials in a unique design to provide both for expansion and for maximum ventilation.



The Nonbreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY

• ESTABLISHED 1891 •

221 WEST THIRD STREET, CINCINNATI 2, OHIO

prior to that time employed by the De-Vilbiss Co. as a sales and service engineer.

CARNEGIE-ILLINOIS STEEL CORP. has appointed Robert J. Ritchey as manager of the market development division of the sales department, formerly known as the sales promotion bureau.

WILLIAM L. RODGERS has joined the Goodyear Tire & Rubber Co.'s mechanical goods department to handle V-belt sales in the Chicago territory. He goes to Goodyear from the Dayton Rubber Co., Chicago, for whom he was agricultural representative on V-belt sales among large manufacturers of agricultural machinery.

BOSTON WOVEN HOSE & RUBBER CO. announces that John H. Rowe, for the last several years Chicago manager, has been made vice president in charge of western sales, covering the territory from Chicago to the Pacific Coast. As of Aug. 1, Stuart A. Guild will become manager of the Chicago office. Mr. Guild has been in charge of the Connecticut, Rhode Island and western Massachusetts territory.

JOSEPH F. REED, 63, president and treasurer of Kol-Master Corp., stoker manufacturer at Oregon, Ill., died June 12 at his home, Rock Ledge, on Rock River near Oregon. In 1912 he organized the Paragon Foundries Co., which in 1916 he moved to Oregon, Ill. In 1929 he organized the Paragon-Kol-Master Corp. and engaged in the manufacture of coal stokers. Later the company's name was changed to Kol-Master Corp.

NATIONAL BATTERY Co., St. Paul, Minn., has appointed L. G. Gilmore as advertising manager, succeeding Kenneth Dawkinus, now a Navy ensign stationed at Washington, D. C. A Princeton alumnus, Gilmore was connected with the General Electric Co. for 14 years in advertising, business training, commercial research and sales assignments.

JEFFREY MFG. Co., Columbus, Ohio, announces the appointment of Byron M. Bird as technical consultant on coal preparation and ore dressing matters. Mr. Bird is a graduate in metallurgical engineering of the University of Washington, and since 1930 has been associated with Battelle Memorial Institute, Columbus, in charge of research on coal preparation.

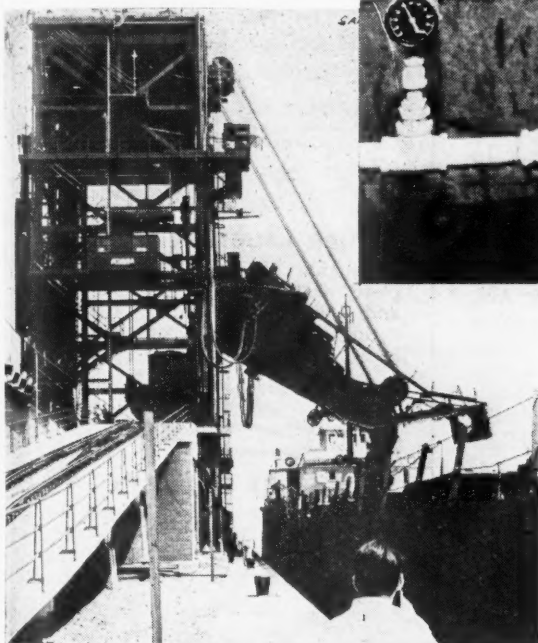
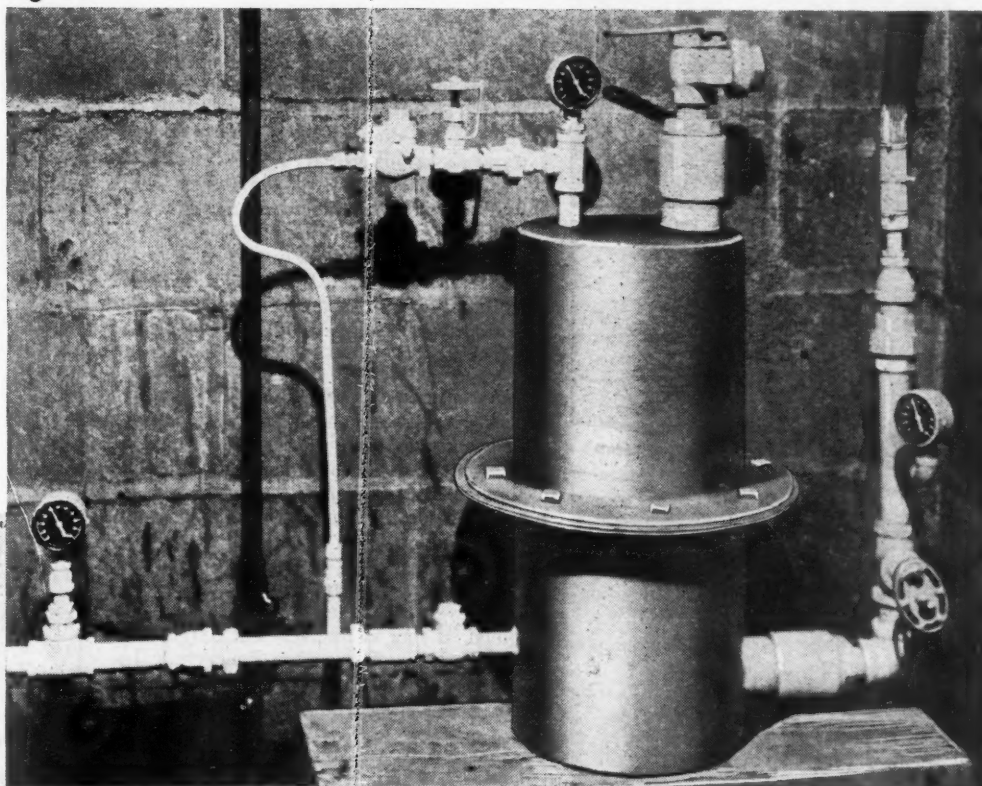
CATERPILLAR TRACTOR Co., Peoria, Ill., has elected William Blackie and William J. McBrien to the positions of vice-president. William H. Franklin was made controller to succeed Mr. Blackie, and Edward W. Jackson has been appointed general parts manager. Mr. McBrien was made treasurer of the company in 1939. He joined Caterpillar in 1928. Mr. Blackie came to the company in 1939 as controller, and Mr. Franklin was assistant controller for three years. Mr. Jackson joined the company in 1929 and in 1942 was made assistant to the president.

COPPERWELD STEEL Co., Glassport, Pa., has appointed A. R. Teifeld as advertising manager. Mr. Teifeld was con-

TURN DUST *into* DOLLARS!

Illustrated at right is the Equa-Mixer developed for the efficient application of "Sealtite".

"Sealtite" is now being applied successfully in both anthracite and bituminous fields and at Railroad Docks (see below) Public Utilities etc.



● The most logical places to eliminate (and save) coal dust are at points of origin—at the working face and in the tippie. Knock it down underground before it has a chance to be diffused into the ventilating circuits and before it can be stirred up by loading machines or conveyor discharge heads. Coal dust controlled and saved means increased production and more dollars realized per ton of coal produced. To say nothing of the values obtained in increased visibility—improved working conditions—reduction in explosion hazards.

Coal in mine transportation suffers some breakage and further generation of dust can be controlled at the tippie or cleaning plant dumping, crushing, conveyor loading and discharge points.

DO IT WITH **Sealtite** ORIGINAL DUST CONTROL SYSTEMS
(Pats. Pend.)

By saving dust, the saving on most coals averages four-tenths of a ton per car of coal. Many operators are also finding that "Sealtite" savings make its use cost free.

"Sealtite" is the oldest known chemical compound and one of the most widely used successfully inside mines and around tipples as a method of dust

elimination. The Sealtite formula has never been changed nor the product given a substitute name—"Sealtite" is the original dust eliminator. "Sealtite" is non-inflammable, non-corrosive and non-injurious.

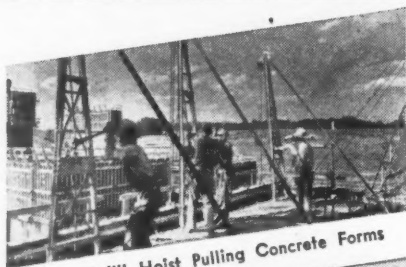
Let us show you how "Sealtite" can be used at a profit. Ask our representative to call and give you full details. No obligation.

The MIDLAND SEALTITE Corporation

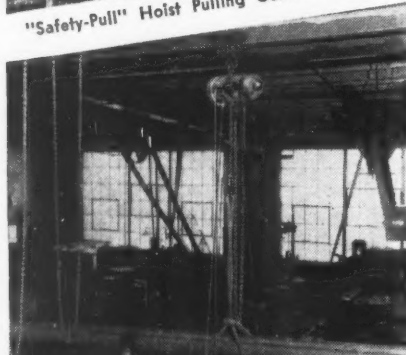
MIDLAND BLDG.,

CLEVELAND 15, OHIO

COFFING HOISTS



"Safety-Pull" Hoist Pulling Concrete Forms



"Quik-Lift" Electric Hoist Speedily Moving Pipe



Model "YC" Spur Geared Hoist Moving Large Truck Motor

Write Today for Catalog GG-6

**FOR SPEED
SAFETY
ECONOMY
DURABILITY**

IN PRACTICALLY ALL LINES OF
INDUSTRY COFFING HOISTS
ARE PLAYING A PROMINENT
PART IN SPEEDING UP

CONSTRUCTION

PRODUCTION

MAINTENANCE

COFFING HOIST COMPANY

Danville, Illinois, U. S. A.

nected with the American Steel & Wire Co., Cleveland, for 21 years, and is a native of Chicago.

CARDON CORP., Mining Division, Chicago, has announced several changes in its sales staff. Fred O. See, for eight years field manager of the Virginia, West Virginia, Tennessee and Kentucky district, has been named director of sales. A. E. Riley, former assistant in Mr. See's district, has been made manager of the district with headquarters at Middlesboro, Ky. L. V. Caudill has been named manager of the southern West Virginia district with headquarters at Beckley, W. Va., and R. E. Cote will head the central West Virginia district with headquarters at Summersville, W. Va.

AMERICAN CAR AND FOUNDRY CO., Berwick, Pa., has announced that S. F. Udstad has returned to his duties as assistant to the general mechanical engineer after an absence of two years as assistant chief of rolling stock section, transportation equipment division, War Production Board.

BABCOCK & WILCOX TUBE CO. announces that Marcel A. Cordovi has joined its staff as research metallurgist. He is a graduate of Brooklyn Polytechnic Institute and was formerly associated with the Engineering Foundation.

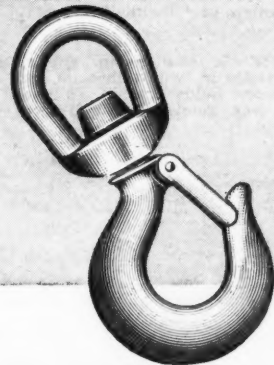
EUCLID ROAD MACHINERY CO., Cleveland 17, Ohio, has appointed Columbia Equipment Co., 1240 S. E. 12th Ave. Portland, Ore., as distributor of its equipment in the following counties in Washington: Wahkiakum, Cowlitz, Clark, Skamania and Klickitat; also in Oregon except the counties of Walla, Union, Baker and Malheur. Headed by F. B. McBath president; F. L. Jerome, vice president and H. R. Hicks, sales manager, Columbia has its main office and warehouse at Portland, with a branch office in Seattle.

WESTINGHOUSE ELECTRIC & MFG. Co., East Pittsburgh, Pa., has appointed J. B. MacNeill as manager of the switchgear and control division. He succeeds R. A. Neal, recently elected a vice president and assigned to new duty. Mr. MacNeill has been associated with Westinghouse since 1909 with the exception of several years during which he studied electrical engineering at Massachusetts Institute of Technology. C. P. Croco has been named as manager of a newly formed welding department of the motor division at the Trafford (Pa.) works. Mr. Croco, who ended an 18-year association as an engineer with Westinghouse in February, 1943, to become director of engineering for the Federal Machine & Welder Co., Warren, Ohio, returns to the company to assume responsibility for engineering, manufacture and sales of all arc-welding equipment and electrodes manufactured at Trafford.

TIMKEN ROLLER BEARING CO. has organized a subsidiary, the Timken Roller Bearing Co. of South America, to handle engineering development of Timken products in Latin-American countries after the war under the direction of Jules A. Morland. As part of the

SLINGS CAN'T SLIP OFF!

Laughlin Safety Hooks have a unique latch designed to prevent loads from slipping or jolting off the hook. Green workers can work with less fear of accidents... older hands will appreciate this safety feature. Laughlin's Safety Hooks are made of heat-treated, drop-forged steel.



OTHER LAUGHLIN FITTINGS

Laughlin offers you the most complete line of hoist hooks on the market, and there are standard Laughlin fittings for almost any other requirement.



ROPE SOCKETS

Rope sockets of drop-forged steel are available in sizes $\frac{1}{4}$ " to $1\frac{3}{4}$ " (open pattern) and sizes $\frac{1}{4}$ " to $1\frac{3}{4}$ " (closed pattern), plain or galvanized finish.



WELDLESS TURNBUCKLES

Weldless Turnbuckles are available in all types and sizes from $\frac{1}{4}$ " x 4" to $2\frac{1}{2}$ " x 36". The largest turnbuckle ever made by drop-forging was produced by Laughlin... a giant of 440 pounds for a 50 ton boom.

Laughlin's latest catalog shows the complete line of Laughlin Wire Rope Fittings. Send for it.

Distributed through
Mill, Mine, and Oil Field Supply Houses
Look for Laughlin Products in
Coal Mining Catalog

FORGING A SHARE IN VICTORY

THE THOMAS LAUGHLIN Company
PORTLAND & MAINE



DULL DRILLS and CUTTING TOOLS mean lost production

KEEP THEM SHARP WITH QUEEN CITY GRINDERS

Get greater production by keeping your drilling and cutting equipment operating at peak efficiency. Queen City Grinders will easily sharpen your hardest, toughest drills and cutting edges, insure longer tool life, save tool maintenance and replacements. Install a Queen City Grinder and make cutting equipment easier to handle, reduce operator fatigue, increase output. Write us in regard to your grinding problems.

AGENTS IN
PRINCIPAL CITIES



Illustrated is the No. 11F-5 H.P. Heavy Duty Floor Grinder, suitable for heavy or fine work. Has adjustable work rests and shatterproof eyeshields to provide maximum safety and operating conveniences. 2 Carborundum wheels with enclosed guard and built-in exhaust outlet. Overall dimensions are: 33½" long, 22" wide, 53" high.

Send for New Catalog

**QUEEN CITY
MACHINE TOOL CO.**
217 E. SECOND ST.
CINCINNATI 2, OHIO

The greatest help a coal mining man can have—

IF YOU want to make sure of getting your certificate of competency—sure of winning a bigger job with bigger pay, get Beard's great books today and put them to work for you.

In these three books you have a practical, always-on-the-job guide that will help you solve the problems you face every day, show you what to do, tell you why it should be done.

Beard's

Mine Examination Questions and Answers

3 volumes — \$7.50, payable in four monthly payments

THESE books explain what a man must know in order to become a mine inspector, a mine foreman, assistant foreman, fireboss, hoisting engineer, safety engineer, shot-firer, etc.

They give you complete and authoritative information about air and gases, explosives, safety requirements and methods, mechanics, engines, hoisting, drainage, pumping, ventilation, timbering, instruments, and every other detail that the practical mining man must know.

Can you answer these questions—

What is meant by splitting the air current and what are the advantages derived from such methods?

Can a miner live in air in which the oxygen content is reduced to 17 per cent?

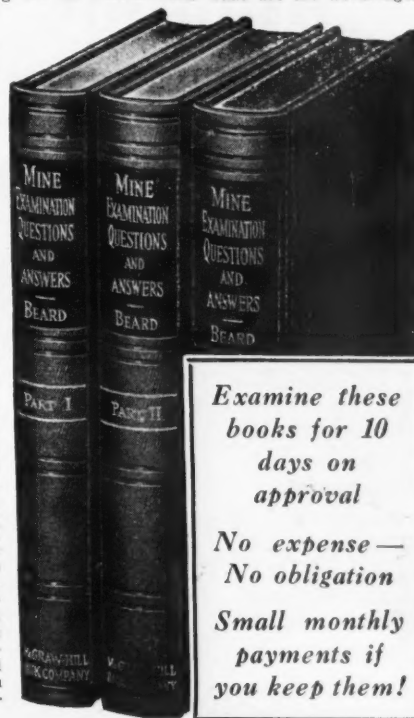
Name five duties imposed on mine foremen by law?

In what time can an engine of 40 effective hp. pump 4,000 cu. ft. of water from a shaft 360 feet deep?

What are the advantages and disadvantages of a gasoline pump, an oil pump and an electrical pump?

What is the estimated tonnage per acre, per foot of thickness, for bituminous coal?

These are but a few of the more than 2000 questions given in Beard's books together with full correct answers. Hundreds of men have used this method to prepare for higher, better jobs. You can too, if you have the Beard books and plan to use them systematically. They are the best investment that a mining man can make—not only as an aid for passing examinations but as practical reference volumes on everyday mining operation problems.



Examine these
books for 10
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No expense—
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Small monthly
payments if
you keep them!

McGraw-Hill ON-APPROVAL COUPON

McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y.

Send me, charges prepaid, Beard's Mine Examination Questions and Answers, 3 volumes, for 10 days' examination. If satisfactory I will pay \$7.50 at the rate of \$1.50 in ten days and \$2.00 per month. If not wanted I will return the three volumes postpaid.

Signature

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He needs your help
So do his buddies

BUY BONDS



to support their bravery and
skill that will win the Peace.

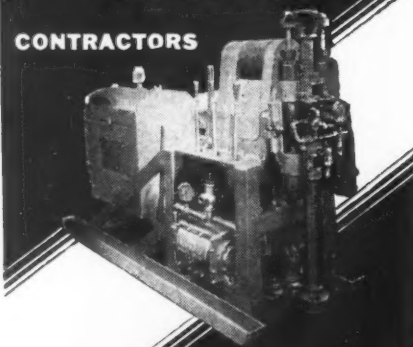
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Mayfair

SAINT LOUIS

AIR-CONDITIONED • NOISEPROOFED

MOTT DIAMOND CORE DRILLING

CONTRACTORS



Mott Type "A" Oil
Hydraulic 1500 Ft. Cap.,
2 1/4" Diameter Core.

• Coal and all mineral properties tested—
using our light gasoline drills. They save
fuel and moving costs... guarantee satis-
factory and proper cores.

Pre-pressure grouting for mine shafts...
ground solidification for wet mine areas by
our stop grout method. Water wells and
discharge holes drilled and grouted...
electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

organization program, two young Brazilian engineers, Murillo Garcia Moreira, of Rio Janeiro, and Jose Marianno Chaves, of Sao Paulo, are familiarizing themselves with the engineering production and application of Timken roller bearings and steel in the company's Canton plant, and are later to spend some time in the Mt. Vernon plant, where rock bits are manufactured.

CHARLES J. HARDY, chairman of the board, American Car & Foundry Co., received the honorary degree of Doctor of Laws from DePaul University at its 46th convocation, in Orchestra Hall, Chicago, June 7. A graduate of Columbia University Law School, Mr. Hardy specialized in corporation law and was for 25 years general counsel for A.C.F. prior to his election as president, in March, 1933.

TRUCKSTELL MFG. Co., a stockholder distributor organization consisting of about 40 national distributors of truck equipment; Don Meyer and Milt W. Anderson, founders of the company, and other nationally known transportation men, has been incorporated at Cleveland, Ohio. Plans have been laid for development and manufacture of new equipment and for expansion of facilities to handle additional lines of manufactures needing the service of such a national distributor organization.

AMERICAN CHAIN & CABLE Co., Inc., has appointed Frank W. Bemis as sales manager of its American Cable and Hazard Wire Rope divisions, with headquarters at 230 Park Ave., New York. He has been with the company since 1938.

CATERPILLAR TRACTOR Co., Peoria, Ill., plans to add to its line a wide range of sizes and types of earth-moving machines—bulldozers, scrapers, rippers and cable-control units—matched both to the current sizes of Caterpillar track-type tractors and to the present and future sizes of rubber-tired wheel-type prime movers. The additions will be made as military requirements make possible.

W. O. ARZINGER MACHINERY Co. has opened an office and laboratory at 25 South Gallatin Ave., Uniontown, Pa., where it has installed a pilot washing unit to handle 0 x 3/4-in. material for the beneficiation of coals from stripping operations, mine gob or mine-run coal, also for the separation of coke from old beehive breeze dumps, salvage of anthracite from banks, etc. Mr. Arzinger is supervising the installation of several washing units.

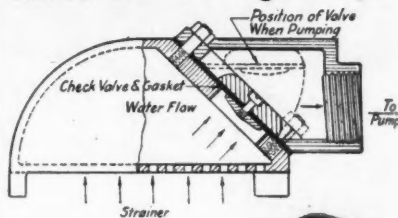
OLIVER UNITED FILTERS, INC., announces that J. F. Mitchell-Roberts, manager of the foreign and export division, has resigned his position with the company.

NORMA-HOFFMANN BEARINGS CORP., Stamford, Conn., announces that following his reelection as vice president and director, Harold J. Ritter has resigned as of June 30. He has been with the com-

FOOTVALVE STRAINER

FOR

Mine Gathering Pumps



• A device
that answers
a long-felt
need of Mine



Operators! This improved accessory to pumping equipment offers a straining surface that approximately doubles the area of pipe for which the device is tapped.

Write for details today! Complete information on request.

GUYAN
MACHINERY CO., INC.
LOGAN WEST VIRGINIA

HERCULES AUGERS

Hercules Augers

Ideal for modern high speed electric drills—with-stands whips and torsional strains. Flint hard and tough as whalebone. Drills faster—drills more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 3" diameters—up to 16 ft. in length.

Black Diamond Augers

Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.

Standard Augers

Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps, and ditch blasting. Up to 2" diameters from oval steel, 7/16" thick, and maximum length of ten ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or phone for details concerning sizes, prices, deliveries, etc.

SALEM TOOL COMPANY
SALEM OHIO

pany for 28 years, beginning his career there as secretary to the founder of the company.

PHILCO CORP., Philadelphia, has named John M. Otter as sales manager for the home radio division and Walter H. Eichelberger as sales manager for the refrigerator division.

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., has elected to its board of directors Ernest Mahler, executive vice president of the Kimberly-Clark Corp., Neenah, Wis. He takes the place of R. G. Hutchins, New York, who retired after 31 years of service on the board. John J. Kane has been appointed general patent attorney, succeeding George F. DeWein, who resigned after 40 years in the A.C. patent organization. Charles S. Lincoln, 59, chief design engineer of the crushing and cement divisions, died May 24.

BRISTOL CO., Waterbury 91, Conn., has appointed A. G. Budd as mill supply products salesman for the Cleveland and Pittsburgh areas, with headquarters at the branch office in Cleveland.

MARION STEAM SHOVEL CO., Marion, Ohio, has appointed C. F. LaMarche as president and general manager, vice D. J. Shelton, deceased. J. M. Strelitz has been named chairman of the board. Mr. LaMarche has been a director since 1939. Mr. Strelitz is a prominent local attorney.

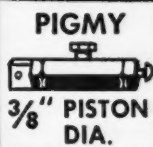
WICKWIRE SPENCER STEEL CO., New York City, has promoted R. T. Dunlap to vice president in charge of production. A. G. Bussmann has been advanced to assistant to the president. Mr. Dunlap previously was vice president and general superintendent of the Buffalo district. B. L. McCarthy has been promoted to assistant general superintendent of the Buffalo plant. C. A. Gordon has been made superintendent of hot departments at the Buffalo plant.

Trade Literature

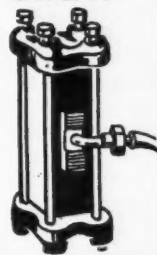
CATERPILLAR PRODUCTS—Caterpillar Tractor Co., Peoria, Ill. Booklet Form D-41 illustrates the complete line of Caterpillar diesel engines, tractors and road machinery on earth-moving, agriculture, logging, mining, oil-field and other power jobs. Described and pictured are tilling the soil, harvesting crops, moving earth, powering textile mills, mines, village power plants, sawmills, service stations, boats, buildings and maintaining roads.

COAL CLEANER—Roberts & Schaefer Co., 207 North Michigan Ave, Chicago 1, Ill. Bulletin 163 gives a complete description of all working elements of the Stump airflow cleaner. Introducing the basic principles of aerodynamics, the use of the cleaner is said to enable the operator to obtain a maximum cleaning effect with a minimum of power and attention. It also is pointed out that the fundamental principle of the air-flow cleaner is the uni-

There's a BRANFORD PNEUMATIC VIBRATOR for EVERY SPOT!



GIANT



8" DIAMETER
PISTON

WHERE CLOGGING OCCURS
in Pipes; Hoppers, Bins, Chutes, etc.

Quick Acting Starting Valve
Controls Rate of Flow

Write — State Problems

Send plan of equipment — Specifications — Tonnage
handled — Wet or dry materials — Size of materials
— Ask for Bulletin "E".

NEW HAVEN VIBRATOR CO.

150 Chestnut St.
NEW HAVEN 7, CONN.



The Searchlight Section of Coal Age

features Employment, Equipment and Business Opportunities identified with the mining of coal.

"Searchlight" ads are referred to regularly by readers interested in such "Opportunities."

You can therefore bring "Opportunities" you have to offer to the attention of these readers quickly, and at small cost, through an advertisement in the Searchlight Section. (See pages 170-175)

MESCOWELD Rail Bonds...

assure:

- 1 Simplified Application
- 2 Greater Conductivity
- 3 Added Circuit Strength
- 4 Longer Bond Life

Mosebach Rail Bonds—your most
efficient link between power
and profit.



MOSEBACH

ELECTRIC & SUPPLY COMPANY
1115 Arlington Avenue, Pittsburgh, Pa.

form distribution of air by controllable internal resistance.

MINING SPECIALTIES—Johnson-March Corp., 52 Vanderbilt Ave., New York 17, N. Y. Bound bulletins cover such Jomco products as Coaladd, Coaladd LST, Kem-oil, Compound M, Wetsol, Compound 100, Colspra, Asphaltic Coating No. 150, Protectocoat No. 160, Aquaproof No. 200, Stearate paste No. 300, Hardenfast No. 340, Quickset Nos. 350, 355 and 360, concrete flood hardener No. 400, Ferrotite No. 600, Ferropatch No. 615, Ferrogrout No. 690, caulking and pointing compounds and Hunt process BX 100.

OIL RECLAIMER—Youngstown Miller Co., Sandusky, Ohio. Bulletin YM-700 covers Robot oil reclaimer, said to be capable of restoring all kinds of lubricating, hydraulic, cutting and vacuum pump oils so that the reclaimed oil can be re-used in the same manner and place as new oil. Capacities range from 4 to 300 gal. per hour.

PORTABLE CAR UNLOADER and PORTABLE SCRAPER CONVEYOR—Jeffrey Mfg. Co., Columbus 16, Ohio. Bulletin 779 describes the Type 246 portable car unloader, which operates above or below the rails, handling coal at the rate of 75 t.p.h. Bulletin 781 depicts the Type 242A portable scraper conveyor built in 25-, 30- and

35-ft. lengths and furnished with electric motor or gasoline engine that handles up to 75 t.p.h.

ELECTRONIC RELAY—General Electric Co., Schenectady, N. Y. Bulletin GEA-4214 describes construction, operation and application of G-E electronic relay CR-7511-A.

SYNTHETIC RUBBER FOOTWEAR—B. F. Goodrich Co., Akron, Ohio. Catalog Sec. 12040 pictures and describes work boots, shoes and rubbers and tells what rationing regulations are effective on each.

MINE TIES—Koppers Co., Wood Preserving Division, Pittsburgh 19, Pa. Bulletin G-25 asserts that 40 percent monthly savings are made in tie costs by mines using Koppers Ar-Moored steel ties in preference to untreated timber ties. Ar-Moored ties are constructed with a creosote pressure-treated oak base to which is fitted a Bethlehem Steel mine tie secured to the wooden base with special nuts and bolts. Available in 2-, 3- and 4-in. bases for a variety of mine haulage tasks, they are furnished with either staggered clips or outside stationary clips.

IDLER—16 page Catalog No. 1919 announces the new "100" anti-friction idler for belt conveyors, manufactured by Link-Belt Co., 307 North Michigan Ave., Chicago. Types include troughed carrying-run

idlers, flat-roll carrying and return idlers, troughed self-aligning idlers, and self-aligning return idlers.

SAF-T-DEK—A non-slip plastic covering for walking areas is described by Truscon Laboratories, Inc., Detroit 11, Mich., in Bulletin 553. It is applied with a trowel and the manufacturer says it will stick to practically any surface.

CABLE TERMINATORS—Publication 4405 has been issued by Delta-Star Electric Co., 2400 Block, Fulton St., Chicago 12. It describes sealed type single and three conductor equipment cable terminators.

SWITCHES—Delta-Star Electric Co., 2400 Block, Fulton St., Chicago, announces Publication 4401 dealing with high-capacity disconnecting switches, 2,000 to 5,000-amp., single-pole, single-throw, stick operated, straight current path, front connected indoor, in voltages from 7,500 to 23,000 and ampere capacities from 2,000 to 5,000.

HAMMERS—Greene, Tweed & Co., Bronx Blvd. at 238th St., New York 66, has published a bulletin describing Basa replaceable face hammers and Empire soft face mallets. Featured in the bulletin are new plastic heads and faces now available as well as rawhide, copper and babbit faces for the hammers and plain or loaded rawhide heads for the mallets.

WIRE AND WIRE PRODUCTS—Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y. Booklet entitled "Let's Take a Tour With Wick and Spen" lists alphabetically the most important of the company's products.

SOLDERING, BRAZING AND WELDING—Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y. Folder entitled "The Theory of Soldering, Brazing and 'Low-Temperature' Welding" tells how the Eutectic process was discovered, explains what happens when the Eutectic welding alloy is deposited on the parent metal at low temperatures, gives various definitions relevant to this new welding process and covers various applications discovered since Eutectic was introduced to the market three years ago.

BEARING LUBRICATION—A bulletin entitled "Aloft Is No Place for A.W.O.L. (absent without lubrication) Bearings" describes the application of the Farval Corp.'s dualine system for sending lubricant under pressure to every bearing on a machine. The manufacturer says it is designed for high-up and hard-to-get-at bearings and eliminates the hazards of manual lubrication. The company is located at Cleveland.

WICK FEED OILERS—Trico Fuse Mfg. Co., 2948 North Fifth St., Milwaukee 12, Wis. Bulletin 27-A illustrates and describes a modernized line of wick feed oilers supplying visible automatic lubrication to solid, wick and waste-packed bearings. Helpful hints on how to eliminate needless shutdowns for hand oiling, end bearing failures, splattering of oil, etc., are given. The plastic reservoir has reinforced ribs for extra strength. Oil is available in 1-, 2-, and 4-oz. capacities.

PROFESSIONAL SERVICES

Consulting
Engineering
Examinations

Specialists
Geologists
Reports

Plant Design
Operation
Construction

ALLEN & GARCIA CO.

ENGINEERS AND BUILDERS OF
MODERN COAL OPERATION
Authoritative Valuations and Reports of
Mining Properties, Equipment and Opera-
tion.

332 S. Michigan Ave., Chicago
120 Wall Street, New York, N. Y.

T. W. GUY

COAL PREPARATION

To Yield Maximum Net Returns
Face and Product Studies
Plant Design and Operation
Coal Sampling

Kanawha V. Bldg. Charleston, W. Va.

GEO. S. BATON & CO.

Consulting Engineers

Valuation, Mine Mechanization and Coal
Preparation.

1100 Union Trust Bldg.
Pittsburgh, Penna.

C. C. MORFIT & ASSOCIATES

Consulting Engineers

Reports, Valuation, Construction,
Operation, Management

11 Broadway, New York 4, N. Y.

EAVENSON & AUCHMUTY

Mining Engineers

Coal Operation Consultants
Valuations

Koppers Bldg. Pittsburgh, Pa.

L. E. YOUNG

Consulting Engineer

MINE MECHANIZATION
MINE MANAGEMENT

Oliver Building—Pittsburgh, Pa.

J. H. FLETCHER

30 Years

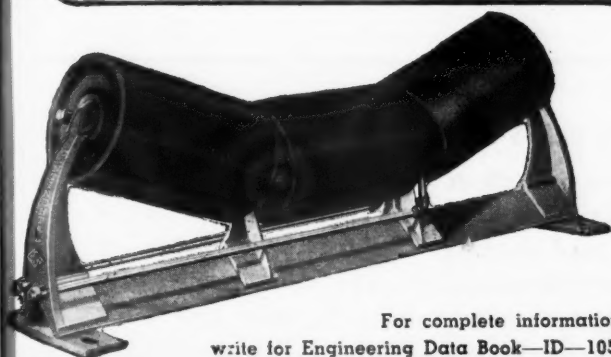
Continuous Consulting Service
to Coal Mines

Telephone Harrison 5151
McCormick Building Chicago, Illinois

READERS MAY CONTACT THE CONSULTANTS

whose cards appear on this page
with the confidence justified by the
offering of these special services na-
tionally.

CONTINENTAL IDLERS SURE CUT HAULAGE COSTS AT OUR MINES



For complete information
write for Engineering Data Book—ID—105.



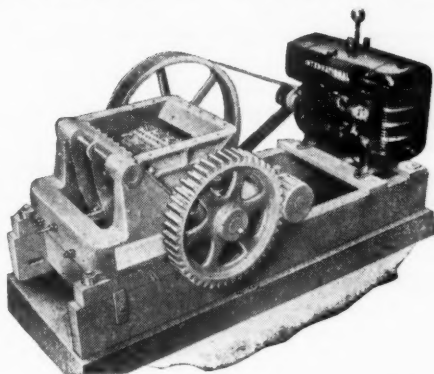
INDUSTRIAL DIVISION CONTINENTAL GIN COMPANY BIRMINGHAM, ALABAMA



ATLANTA • DALLAS • MEMPHIS



McLANAHAN FAST "Bantam Buster" COAL CRUSHER



HERE'S a "cocky" little single roll coal crusher that bites right into big jobs . . . and asks for MORE!

Illustrated is the low-cost powerful, McLanahan "Bantam Buster" with International Engine power drive—a definite production need for the small coal mine operator. Engine, of course, is optional.

WRITE for complete data.

McLANAHAN AND STONE CORPORATION
PIT, MINE AND QUARRY EQUIPMENT HEADQUARTERS SINCE 1835
HOLLIDAYSBURG, PENNA.

HAMMOND'S Latest Type SAFETY EXPLOSIVE BOXES

Approved by Penna. Dept. of Mines

Boxes are constructed entirely of wood, having no metal parts. They are of tongue-grooved and dovetailed construction, having handle for carrying, and are equipped with automatic lock using rubber bands for a spring.

NOTE: There are NO metal parts . . . conforming to regulations of the Penna. Dept. of Mines.

Important: Prompt deliveries of these Hammond products: safety explosive boxes — wood tamping poles — shovel handles — rope rollers — trolley poles. Order today or write for further details.

NET PRICES

Boxes Made in These Sizes:

No. 9 Powder Box	9 stick size...	1.12
No. 12 Powder Box	12 stick size...	1.27
No. 16 " "	16 " "	1.43
No. 20 " "	20 " "	1.58
No. 36 " "	36 " "	2.94
No. 72 " "	72 " "	4.23
No. 6 Detonator Box	2 1/2 x 3 x 6 inside	1.01
No. 8 " "	2 x 2 1/2 x 8 inside	1.01

J. V. HAMMOND
SPANGLER, PENNA.



A LEADING COSMETICS MANUFACTURER REPORTS:

"We cut down the size of our gift boxes and standard packages to effect an over-all saving of approximately 25% of the paper and cardboard; standardized our window displays and eliminated

all die-cuts, as well as steps, shelves and secondary planes. We also folded all displays in half to save more than 50% of the paper and paperboard normally used."

A BIG PLATE GLASS COMPANY REPORTS:

"Our 1944 Color Book was reduced in size and quantity, resulting in a paper saving of 136,000 pounds. Our Color Cards, of which four or five million are used annually, were reduced in size at an approximate reduction of 50% in paper tonnage. We have eliminated our Dealer Sales Portfolio. Our Color Book has become a 'self mailer,' eliminating need for envelopes."

Mr. Manufacturer,
CAN YOU TOP THESE?

The quotations used in this advertisement are from responses to the A. N. A. Committee of Paper Saving.

ONE OF THE TOP LIFE INSURANCE COMPANIES REPORTS:

"In 1944 we will continue to specify lighter weights of paper wherever possible and take all possible steps further to reduce paper tonnage. We are instructing our field offices to scrutinize carefully all requests for printed material and to disapprove all requests for quantities that appear excessive."



A FAMOUS ADDING MACHINE COMPANY REPORTS:

"In advertising and promotion we are using about 30% of the amount of printing and paper used in 1941 — that represents

about 2/3 saving. However, further savings will be effected whenever possible this year as last."

Remember—
**PAPER IS
WAR POWER**



USE LESS—SAVE ALL WASTE PAPER!

This advertisement contributed by this publication and prepared by the War Advertising Council in cooperation with the War Production Board and the Office of War Information.

*Wood or Steel Beams
Go Up Quickly and Safely!*

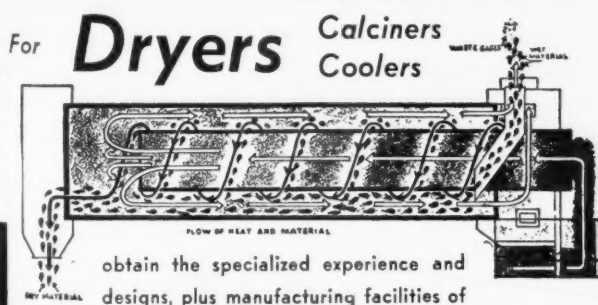
No. 366 Mine Timber Jack. Four sizes: maximum heights, 6'4", 7'1", 8'1" and 8'7". Capacity 3 tons.



Simplex No. 366 Jack is speedily set up, tightens against the roof and floor for double-acting jacking of timbers into place. Does away with staggering under heavy wood or steel beams. Base revolves 360°, making it unnecessary to reset jack due to obstructions. With this jack, two men can place timbers that formerly required four men or more. No. 366 Jack shown is in Willow Grove Mine, Ohio, of M. A. Hanna Company.

Simplex LEVER - SCREW - HYDRAULIC Jacks

Templeton, Kenly & Co., Chicago (44), Ill.
Better, Safer Jacks Since 1899



obtain the specialized experience and designs, plus manufacturing facilities of

THE
L.R. CHRISTIE CO.

17 E. 42nd St.,
New York 17,
N. Y.

"Send us your problems—we would enjoy solving them."



HENDRICK

Carbondale 1600

for

PERFORATED PLATE

Round—Square—Diagonal—Slot

Any perforation

HENDRICK MANUFACTURING CO.

41 DUNDAFF ST., CARBONDALE, PA.

Sales Offices in Principal Cities
Please Consult Telephone Directory



WOOD PIPE for Mine Drainage

Wyckoff Wood Pipe has an 89 year record of perfect resistance to the corrosive action of sulphurous mine water. It is an ideal, long-time investment—light, easy to lay, and relatively low in first cost.

We also manufacture a special Hard Maple Pipe for flushing culm in the Anthracite Region and wood covering for underground steam lines.

Established
1855

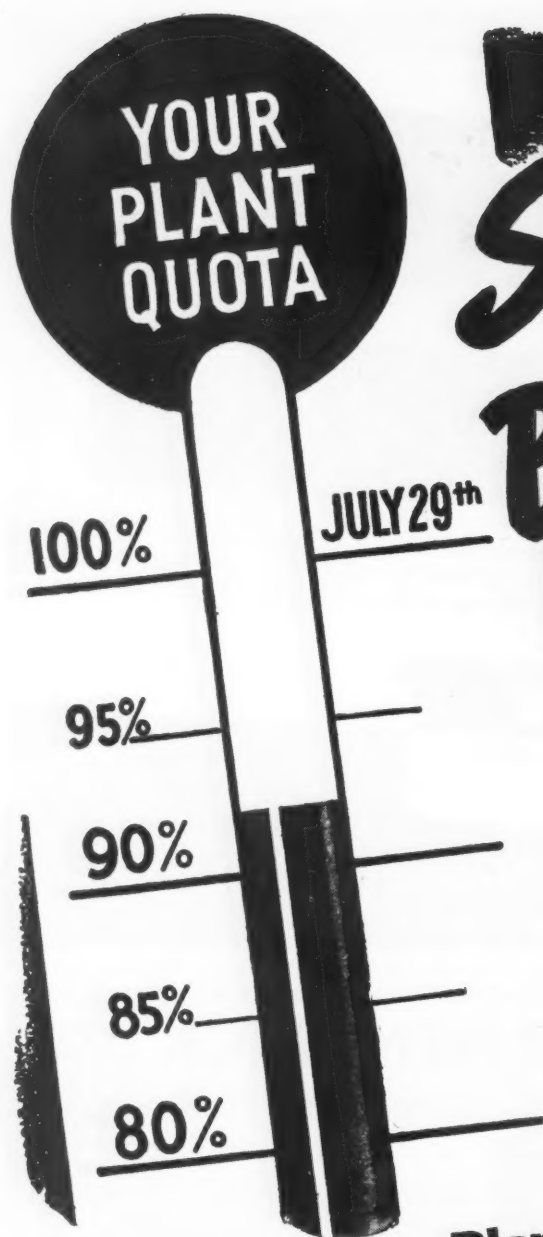


Emergency orders can be delivered by truck to mines in Pennsylvania coal fields following morning after receipt of same.

Shipments from stock day after receipt of order. Send for catalog.

A. WYCKOFF & SON CO.
Office and Factory

No. 35 Home Street, Elmira, N. Y.
The Originators of Machine Made Wood Pipe



Stay at Your Battle Stations!

MANAGEMENT LABOR

—the 5th War Loan Drive is still on.

July 29th is the last pay day in the Drive.

The U. S. Treasury has set the overall goal at \$16,000,000,000 —\$6,000,000,000 from individuals alone. This is the biggest sum ever asked of the American people—and it must be raised!

Keep fighting. The 5th War Loan is a crucial home front battle of tremendous importance to the total war effort.

Tighten up your 5th War Loan Drive organization. Step up your solicitation tempo. Drive! Drive!! Drive!!! Hit your Plant Quota's 100% mark with a bang that'll proclaim to all the world that the U. S. Home Front is solidly in back of the Fighting Front.

Need help? Need ideas? Call on the Chairman of your War Finance Committee. He's standing by.

Here's the Quota Plan:

1. Plant quotas are to be established on the basis of an average \$100 cash (not maturity value) purchase per employee.
2. Regular Payroll Savings deductions made during the drive accounting period will be credited toward the plant quota.
3. Employees are expected to contribute toward raising the cash quota by buying extra 5th War Loan Bonds: 1—Outright by cash. 2—By extra installment deductions. 3—By extra installment deductions plus cash.

Example: JOHN DOE MFG. CO.—1,000 Employees

1,000 Employees x \$100	.. \$100,000 Cash Quota
Regular payroll deductions during the eight weekly payroll accounting periods of June and July.	30,000
	\$70,000 (to be raised by sales of extra Bonds).

BACK THE ATTACK—SELL MORE THAN BEFORE

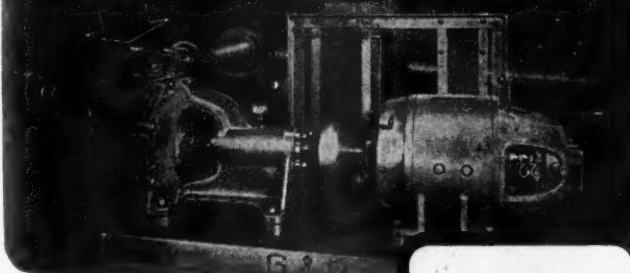


The Treasury Department acknowledges with appreciation the publication of this message by

COAL AGE

★ ★ This is an official U. S. Treasury advertisement—prepared under the auspices of Treasury Department and War Advertising Council. ★ ★

**it PUMPS 24 hours a day
with no "shut downs"**



The keynote of the dependable, G & R Mine Gathering Pumps is the word "simplicity". Because of greater simplicity (only one moving part — the impeller), these Self-Priming Centrifugals will pump more water, more continuous hours, per dollar invested than any other type. No valves to clog; no cylinder liners to be cut out; no gears, cams, levers, etc., to wear, break, or cause trouble. Pumps operate at motor speed. Capacities up to 220 GPM; heads up to 125 ft. Our engineering department will survey your requirements and make recommendations or write for Bulletin MP-2. It's free.

See our catalog data in Coal Mining Catalogs

THE GORMAN-RUPP CO.
MANSFIELD, OHIO

IN WEST VIRGINIA

The Koppers Company are replacing old pumps as they wear out with G & R self-priming centrifugal mine gathering pumps. At the Helen, Stanaford, Kimball, Stotesbury and Kopperstown Mines 36 G & R Pumps of varying capacities are daily proving their simplicity and dependability.

Distributors in all principal Mining Areas.



FLOOD CITY REVERSIBLE WATER ENDS

The Flood City reversible water end is made of high grade acid resisting bronze . . . furnished as a replacement for any type and make of plunger pump. Walls are extra heavy in cross-section . . .

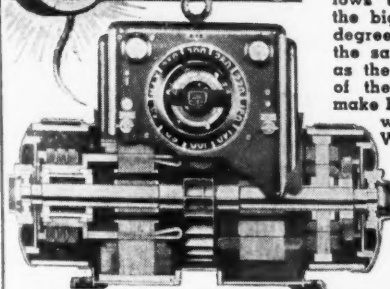
Special valve stem and spring eliminates breakage of parts and prevents clogging . . . tapered valve seat fits eliminate troubles found with threaded seats.

You will profit by using the Flood City reversible water end. Write today for details or order direct.

P. S. Either end can be bolted to the power frame so the suction and discharge can be conveniently connected.

**FLOOD CITY BRASS &
ELECTRIC COMPANY**
JOHNSTOWN, PA.

CHECK...THE HOBART ARC WELDER Before You Invest



. . . in welding equipment and you'll find there are no jobs too large or too small for Hobart "Simplified" Arc Welders. The 1,000 combinations of voltage and amperage available with finger tip Multi-Range Dual Control allows the operator to weld the big jobs with the same degree of accuracy and with the same ease of operation as the small jobs. Just one of the many features that make Hobart the outstanding welder on the market. Write for information!

FREE!
Welder's
Handy Vest
Pocket Guide
Has Tables,
Charts, Valuable
Data.



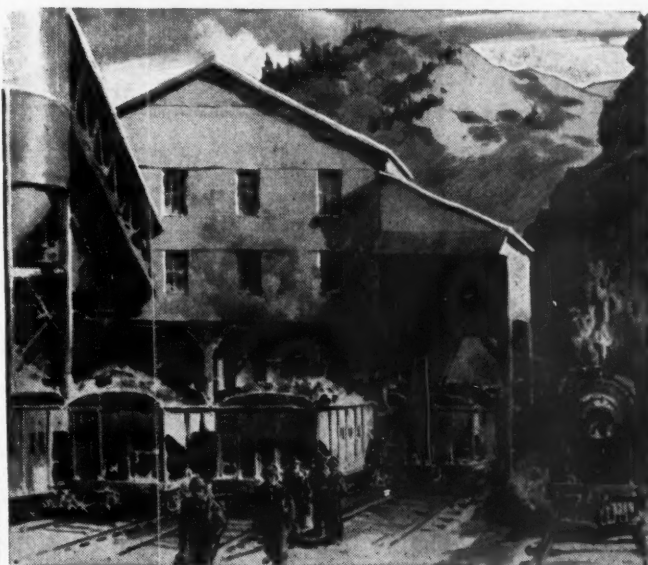
• Note the single unit, well balanced design. It's quality-built for hard use and long wear.

**HOBART
"Simplified"
ARC WELDERS**



HOBART BROTHERS CO., Box 74, Troy, Ohio

"One of the World's Largest Builders of Arc Welders."



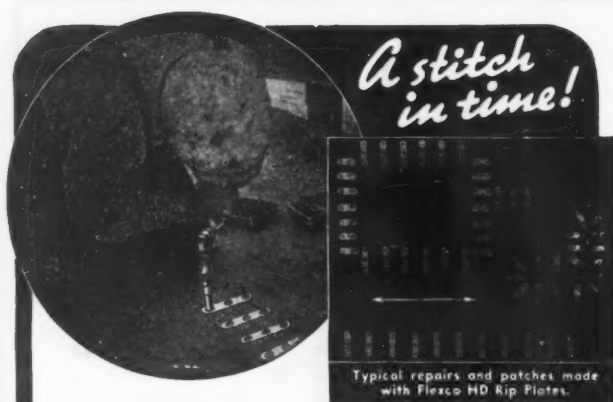
The Advantages of Dowflake for Treating Coal

- ★ Makes coal dustless
- ★ Easy to apply
- ★ Prevents freezing
- ★ Improves consumer acceptance

THE DOW CHEMICAL CO., Midland, Michigan
New York • Boston • Philadelphia • Washington
Cleveland • Detroit • Chicago • St. Louis • Houston
San Francisco • Los Angeles • Seattle



DOWFLAKE CALCIUM CHLORIDE 77-80%



*A stitch
in time!*

Typical repairs and patches made
with Flexco HD Rip Plates.

THOUSANDS of men in industrial plants, mines and mills all over the country are doing just what this man is doing. They are cutting costs by repairing conveyor belts with Flexco HD Rip Plates.

WRITE TODAY FOR BULLETIN F-100 that shows how easy it is to repair rips, to strengthen soft spots and to put in patches by using Flexco HD rip plates. The bulletin also shows how to make tight butt joints in both conveyor and elevator belts with Flexco HD Belt Fasteners. These fasteners are made in six sizes. Furnished in special analysis steel for general use and in various alloys to meet special conditions.

FLEXIBLE STEEL LACING CO.
4638 Lexington St., Chicago, Ill.



Flexco HD
Rip Plate



Flexco HD
Belt Fastener

FLEXCO HD BELT FASTENERS
SOLD BY SUPPLY HOUSES EVERYWHERE

SUTTON SAND DRYING STOVES

The Standard for Over Forty Years

Can Be Operated By Unskilled Labor

Today, when there's manpower shortage, it's important that your equipment is easy to operate—by anybody. That's an important feature of Sutton Sand Drying Stoves. Any worker about the plant can operate it to full capacity.



SUTTON FEATURES

- Made in four sizes to meet all conditions.
- Low original cost
- Economical up-keep
- Distributed by jobbers in all principal cities

Satisfaction Guaranteed
Catalog and Prices sent upon request

INDIANA FOUNDRY COMPANY

950 Oak St., Indiana, Pa.

What

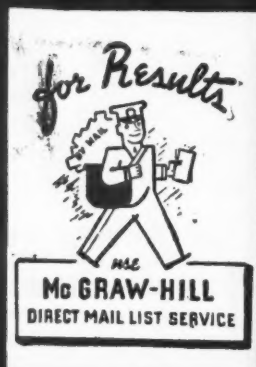
Makes A Mailing *CLICK*?

Advertising men agree—the list is more than half the story.

McGraw-Hill Mailing Lists, used by leading manufacturers and industrial service organizations, direct your advertising and sales promotional efforts to key purchasing power. They offer thorough horizontal and vertical coverage of major markets, including new personnel and plants. Selections may be made to fit your own special requirements.

New names are added to every McGraw-Hill list daily. List revisions are made on a twenty-four hour basis. And all names are guaranteed accurate within two per cent.

In view of present day difficulties in maintaining your own mailing lists, this efficient personalized service is particularly important in securing the comprehensive market coverage you need and want. Ask for more detailed information today. You'll probably be surprised at the low over-all cost and the tested effectiveness of these hand-picked selections.




Direct Mail
Division

McGraw-Hill Publishing Co., Inc.

330 West 42nd Street

New York, 18, N. Y.

*Tough
and we can prove it!*



Alloy Cast Iron GRID RESISTORS

Consolidated resistors have been accepted for years as the economical answer to the grid maintenance problems of some of the largest industries, mines and transportation systems. Their uniform toughness, extremely smooth surfaces with maximum radiation, makes it possible to promise you longer service than you'd ordinarily expect.

Get full information in new circulars!

**The
Consolidated Iron-Steel Mfg. Co.**
1290 East 53rd Street Cleveland 14, Ohio

MAN-power "MP"

It takes Man-Power to make modern organization and equipment effective. The Man-Power of the industry served by COAL AGE is the experienced personnel included among the 12,000 subscribers of this paper. If your organization needs MAN-power, you can locate the best man, or men, available through a Position Vacant Advertisement in the SEARCHLIGHT SECTION of COAL AGE.

PERFORATED METAL COAL MINING SCREENS

Manufactured exactly to your specifications
Any size or style screen, in thickness of steel wanted with any size perforation desired.

We can promptly duplicate your present screens at lowest prices.

CHICAGO PERFORATING CO.
2443 West 24th Place
CHICAGO, ILLINOIS
Canal 1459

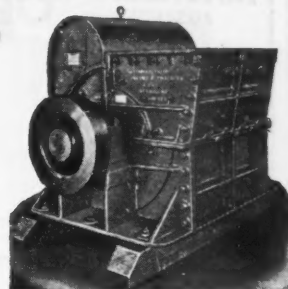
GRUENDLER CRAFTSMANSHIP

Serving Industry over 50 Years

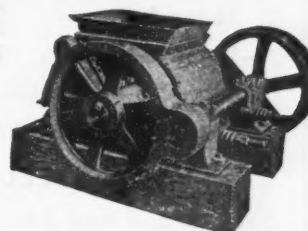
Master Builders of Coal Reduction and Sizing Equipment

**For uniform coal sizes
Lump, Egg, Nut, or Stoker**

Primary crushing of Bituminous mine run coal to 4" minus, capacity 5 Tons per hour, with the Gruendler Ring Hammer Crusher.



Ring Hammer Primary Crusher with patented tramp-metal catcher.



Single Roll Secondary Coal Crusher

"Bulletin mailed on request."



GRUENDLER

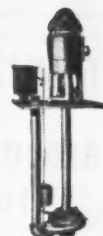
CRUSHER and PULVERIZER CO.

2915-17 North Market St., ST. LOUIS (6), MO.

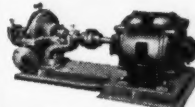
Plan Ahead With WAR-TESTED PUMPS "by Aurora"



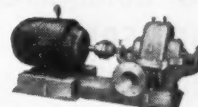
Aurora Deep Well Turbines for all conditions—4" to 24"



NSA Aurora Centrifugal Sump Pump



Type OD Hor. Split Case Double Suction Single Stage Centrifugal

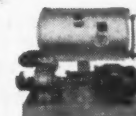


Type AD Hor. Split Case, Two Stage Centrifugal



Type GMC Close-Coupled Centrifugal

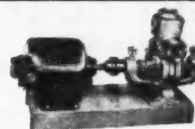
APCO TURBINE-TYPE PUMPS—the simplest of all pumps. Ideal for small capacity, high head duties. Silent, compact and lasting.



APCO Horizontal Condensation Return Unit



Type GGU Side Suction Single Stage Centrifugal



APCO Single Stage Turbine-Type

Write for
CONDENSED CATALOG
OR



DISTRIBUTORS IN PRINCIPAL CITIES



AURORA

PUMP COMPANY

92 Loucks Street, AURORA, ILLINOIS

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT: "OPPORTUNITIES" : EQUIPMENT
BUSINESS: : USED OR RESALE

UNDISPLAYED

RATES

DISPLAYED

(Not available for equipment advertising)
10 CENTS A WORD. MINIMUM CHARGE \$2.00.
Positions Wanted (full or part time individual
salaried employment only), 1/2 the above rates
payable in advance.

Box Numbers—Care of publication New York, Chi-
cago or San Francisco offices count as 10 words.
Discount of 10% if full payment is made in
advance for 4 consecutive insertions.

NEW ADVERTISEMENTS received by July 25 will appear in the August issue,
subject to limitations of space available.

Individual Spaces with border rules for prominent
display of advertisements.

The advertising rate is \$6.30 per inch for all
advertising appearing on other than a contract
basis. Contract rates quoted on request.

An advertising inch is measured 3/4" vertically on
one column. 3 columns—30 inches—to a page.

LOCOMOTIVES — 250 VOLT DC

- 3—15-ton Jeffrey 3—10-ton Goodman
- 1—15-ton Goodman 3—8-ton General Electric
- 5—6-ton General Electric

ABOVE LOCOMOTIVES COMPLETELY REBUILT

STEEL TIPPLES

Several 3, 4 and 5-track complete Steel Tipples.

MISCELLANEOUS

- 10—5-BU Joy Loading Machines
- 2—Joy Elevating Conveyors
- 1—#3 Myers-Whaley Loading Ma-
chine
- 3—Jeffrey 29-C Arcwall Machines
- 3—Sullivan CLU Track Cutters.
- 5—Sullivan CE-7 DC Machines
- 10—12-AA Goodman 250 volt Ma-
chines

ELECTRIC HOISTS FROM 400 TO 1300 H.P. — SLOPE OR SHAFT.

SPOT CASH

FOR COMPLETE MINES GOING OUT OF BUSINESS OR FROM
RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.

Mail us your inquiries!

COAL MINE EQUIPMENT SALES COMPANY

306-7 Beasley Building L. D. Phone-34 Terre Haute, Indiana



Frank J. Wolfe

FOR SALE

KENTUCKY MINE having premium domestic
coal in thick and level seam affording maxi-
mum mechanization. Rail, river and truck
outlets. Owner not active. FS-265, Coal Age,
520 N. Michigan Ave., Chicago 11, Ill.

SMALL MECHANIZED operating coal mine
1200 acres land. Several undeveloped seams.
Splendid market. Wonderful opportunity for
expansion. 1520—13th Ave. Seattle, Wash.

FOR SALE

15000 acres coal and mineral rights

North Missouri on two railroads. 4 ft. Bevier
Seam. 50 to 250 ft. below surface. Low price.

W. N. JENNINGS

Moberly

Missouri

STRIP MINED COAL

Pittsburgh, Redstone, Freeport, Bakerstown
and Kittanning available to Brokers and
Dealers only from the West Virginia fields.

C. T. BEEBE

PO Box 2187 Clarksburg, W. Va.

WANTED

LARGE COAL ACREAGE

Corporation will pay cash for going
coal stripping operation with large coal
acreage or will purchase coal acreage
and strip with our equipment. (Prefer
area with upwards 5 million tons). State
seam and thickness, analysis, amount
of coal, height and type of overburden,
proximity to railroad and other pertinent
data.

BO-254, Coal Age
330 West 42nd St., New York 18, N. Y.

DIAMOND CORE DRILLING, for any mineral.
More than sixty gasoline, steam and electric
drills, suitable for any job. OUR SPECIALTY—
testing bituminous coal lands. Satisfactory cores
guaranteed. Prices very reasonable.

HOFFMAN BROS. DRILLING CO.

PUNXSUTAWNEY, PA. Est. 1902 Tel. 382

MINING MACHINES

AC & DC

REBUILT & GUARANTEED

FOR IMMEDIATE

SHIPMENT

New Electric Coal Drills for
AC and DC

Mine Fans, Tipple Scales, etc.

2—Ironton 5-ton Storage Battery
Locomotives.

Equipment of all kinds

Buy, Sell or Exchange

THE INDUSTRIAL EQUIPMENT CORP.

Warehouse: Carnegie, Pa.
P. O. Box 1647 Pittsburgh 30, Pa.

COMPRESSORS

526 CFM Ingersoll Rand Style "JC"
940 CFM Ingersoll Rand 10 horiz. 3-st.
steam driven with receiver

CRUSHERS

24" x 34" Superior Crushing Rolls
#3 McCully Gyratory, #6 McCully Gyr-
atory

HOISTS

2—American Hoist & Derrick Co., double
drum, motor driven with 40 H.P. A.C.
motors

PUMP, Centrifugal

300 GPM, 50' head, 1750 RPM

SHOVELS

320-B Bucyrus Electric Stripping
No. 2 Koehring 3 way combination crane,
drag and shovel
175-B Electric Revolving Shovel, 7 cu. yd.
dipper, 65' boom

IRON & STEEL PRODUCTS, INC.

13484 S. Brainard Ave., Chicago 33, Ill.
"Anything containing IRON or STEEL"

WE LOOK INTO THE EARTH



By using Diamond Core Drills. We
drill for Limestone, Gypsum, Tale,
Fire Clay, Coal and all other min-
erals.

PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

A DEPENDABLE SOURCE

for

HEAVY EQUIPMENT

CARS — CRANES — COMPRESSORS

DRAGLINES — LOCOMOTIVES

SHOVELS—TRACTORS—ETC.

WE WELCOME YOUR INQUIRIES

WE WILL FIGURE WITH YOU ON
YOUR SURPLUS

B. M. WEISS CO.

Girard Trust Bldg.

Phila. Pa.

RAILS—CARS

All sections of rails and good serviceable second
hand cars, all gauges, also spikes, bolts, frogs,
switches and ties.

M. K. FRANK

No. 6 Blitz Bldg. 810 Park Bldg., Fifth Avenue
Reno, Nevada Pittsburgh, 22, Pa.
New York, N. Y. Carnegie, Pa.

RAILS and ACCESSORIES

RELAYING RAILS—Super-quality machine-recon-
ditioned—not ordinary Relayers.

NEW RAILS, Angle and Splice Bars, Bolts, Nuts,
Spikes, Frogs, Switches, Tie Plates, and all other
Track Accessories.

Phone, Write or Wire

L. B. FOSTER COMPANY, Inc.

PITTSBURGH NEW YORK CHICAGO

RELAYING RAILS

TRACK MATERIALS

RAILWAY EQUIPMENT

QUALITY—SERVICE—PRICE

E. C. SHERWOOD 50 Church St.
New York

(Equipment Wanted Ads—page 172)

**6 YD. or 8 YD.
STRIPPER SHOVEL**
225 Bucyrus 80 ft. Boom, 54 ft.
Dipper Stick, Steam Shovel.

2-4 Yds. SHOVELS
2 Marion Model, 125, Electric, 35' Boom.
25' Dipper Sticks

16 YD. DRAGLINE:
1-16 Yd. Electric Caterpillar Modern Dragline
with 160' Boom

AIR COMPRESSORS:
(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft.
(12*) Belted, 360, 676, 870, 10000, 1300 ft.
(12) Diesel 105, 315, 520, 676 & 1000 ft.
(6) Electric, 1300, 1500, 2200, 2000, 5000 ft.
(14) Gasoline, 10, 160, 220, 310 & 370 ft.

RUBBER CONVEYOR BELTS:
1000' 60", 600' 30", 500' 20", 1000' 42", 900' 48",
1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14"

TANKS:
12,000 and 15,000 gal. and 20,000 gal.

CONVEYOR PARTS:
Idlers, Heads & Tail Pulleys, Steel Frames, Trip-
per, etc., 14 in., 6 in. Large stock here.

STORAGE BATTERY LOCOMOTIVES:
2 1/2 ton Witcomb 24 ga. New Batteries
2-4 ton G.E. 30 in. ga.
3-5 ton Manch 30 in. ga.
4-5 ton G.E. 36 in. ga.
3-7 ton Goodman 36 ga. Battery & Trolley
8-6 ton Baldwin Westgh. 42 ga. & 36 ga.

TRACK SCALE:
150 Ton Buffalo 56 ft. R.R. Track Scale

TROLLEY LOCOMOTIVES:
2 1/2 ton Westinghouse 24 ga.
4-6 ton & 3-5 ton Goodman 36 ga.
3-6 ton Goodman 30 ga.
4-6 ton Goodman 42 ga.
5-6 ton Westinghouse 42 ga.
2-8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey

VIBRATING SCREENS:
9 Tyler Hummer 3x6, 4x5, 4x8 & 4x10
2 Robins Gyrex 4x8 1/2
4x12 Niagara, 3x8 L. B., 5x6 Simplex

CARS:
60-Western 16-20-30 yd. Side Dump
SHOVELS, CRANES & DRAGLINES:
1 yd. K 30 Link Belt 50' Boom Crane
2 yd. Page 70' Boom Diesel Dragline
1 1/2 yd. Marion 450 Elec. Shovel
1 1/2 yd. Lima Diesel Shovel & Dragline
25 ton Browning 50' Boom Loco. Crane

MINE LOADERS:
Junior Joy 36 ga. Low Pan
3-5 BU & 7 BU & 12 BU 36 or 42 ga. Joy
7 Conway 20A, 30A, 50A, 60 & 75 Muckers

MISCELLANEOUS:
5'x60' Traylor Rotary Dryer
Clamshell Buckets 3/4, 1, 1 1/2 & 2 yd. Cap.
30 ton & 12 ton Vulcan St. Ga. Gas. Loco.

WANTED TO BUY:
Complete Mines—M.G. Sets, Locomotives, Com-
pressors, Conveyors, Cranes, Crushers, Mine
Loaders

R. C. STANHOPE, INC.

60 East 42nd St. New York, N. Y.

FOR SALE

Koehring 502 Shovel-Crane-Dragline
Koehring 401 Shovel-Crane-Dragline
Marion 351 Shovel & Dragline, 1 1/2 yard, gas
P & H 650 Shovel and Crane
Buc. Erie GA-2 Shovel, gas
General 1/2 yd. Diesel Crane
Universal 7 1/2 ton Crane on Mack Truck, rebuilt
Lorain 45 Crane-Shovel, 3/4 yd.
Conway Mucker "75", 36" gauge
2-Conway Muckers "50", 36" ga. rebuilt
Buc. Erie 50B Steam Shovel-Crane, 2 yds.
Marion Model 37 Steam Shovel, 1 1/4 yds.
Koehring 301, 3/4 yd. Shovel & Crane
Lorain 30 Shovel, Crane & Backhoe
Buc. Erie Steam Dragline, 6-8 yds, 175' bm.
Moore Speedcrane 15 tons, gas, 63' boom
Speeder 1/2 yd. Backhoe
Ind. Brownhoist Crane, gas, 40' boom, 1 yd.
Allis Chalmers "L" Tractor with bulldozer
Allis Chalmers "LO" Tractor with bulldozer
Allis Chalmers "K" Tractor with bulldozer
Int T35 Tractor with Angledozer
Caterpillar D35 Tractor with bulldozer
Allis Chalmers "30" Tractor with bulldozer
Jaw Crushers: 12x26, 13x30, 14x28, 16x32, 24x36
Gyratory Crusher, Superior-McCully 30"
Gyratory Crusher, Traylor Type T, 12"
Mundy 35 H.P. double drum gas Hoist
National 100 H.P. dbl. drum Dragline Hoist, elec.
Baldwin 78 ton Side Tank Locomotive, Rebuilt
American 75 ton Locomotive, steam, Rebuilt
American 45 ton Saddle Tank Switcher
Vulcan 30 ton Steam, std. gauge Saddle Tank loco.
Vulcan 25 ton Steam, std. gauge Locomotive, side
tank
Vulcan 20 ton Gas, std. gauge Locomotive, rebuilt
Whitcomb 14 ton, 36" gauge Diesel Loco.
Davenport 10 ton, std. gauge, gas Loco.
Vulcan 6 ton, 36" gauge, gas Locomotive
Steel Storage Bin 200 tons, 3/4" plating
I. R. 1302 CFM., 2 stage Air Compressor
I. R. 1050 CFM., 2 stage Compressor, gas drive
Bucket elevator, belt, 22", buckets, 35"
Faiss 3/4 yd. Clam, rehandling Bucket
Erie 3/4 yd. Clam, rehandling Bucket
Blaw-Knox 7/8 yd. Clam, digging Bucket
Hayward 7/8 yd. Clam, digging Bucket

RICHARD P. WALSH CO.

30 Church St. New York 7, N. Y.

**FOR
IMMEDIATE
DELIVERY
OF
RUBBER PRODUCTS**

Conveyor Belting...Transmission
Belting...Elevator Belting...Fire,
Water, Air, Steam, Suction or
Welding Hose, etc.

CALL, WIRE or WRITE
CARLYLE
THE
RUBBER HEADQUARTERS

**CARLYLE RUBBER PRODUCTS ARE
NEW, GUARANTEED & LOW PRICED**

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices - Mention Size and Lengths

ENDLESS "V" BELTS

"A" WIDTH All Sizes "D" WIDTH All Sizes
"B" WIDTH All Sizes "E" WIDTH All Sizes
"C" WIDTH All Sizes Sold in Matched Sets
Inquire For Prices - Mention Size and Lengths

PROTECT THAT PLANT

FIRE HOSE

**APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED**

Size	Length	Per Length
2 1/2"	50 feet	\$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1 1/2"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

CARLYLE RUBBER CO., Inc.

62-66 PARK PLACE

NEW YORK, N. Y.

**FOR SALE
STEEL TANKS—STEEL BUILDINGS**

All sizes and kinds
Guaranteed used steel pipe
Valves and fittings
All items at various points

JOS. GREENSPON'S SON PIPE CORP.
Natl. Stock Yds., St. Clair Co., Ill.

**PIPE—MACHINERY—GAS ENGINES
AIR COMPRESSORS—DIESELS—PUMPS**

Some Steam Engines and Boilers available only slightly above the metal price

BRADFORD SUPPLY COMPANY

WAYNE, WOOD COUNTY, OHIO

Near Toledo

**IRON and STEEL PIPE
New and Used**

Large stocks, all sizes
attractive prices

L. B. FOSTER COMPANY
P. O. Box 1647 Pittsburgh 30, Pa.

LOCOMOTIVES

Goodman: All 250 volts.
 1—10 ton, 31-1-4-T.
 1—6 ton, 30B, 43" 1—5 ton.
 1—5 ton, W-1-2, 36".
 2—5 ton, 2600 K.
 1—6 ton, 33-1-4-T.
 2—8 ton, 32-1-4-T.
Westinghouse: All 250 volt.
 1—4 ton, 902, 48" 1—13 ton, 102, 42"
 1—904 c. 44" 500 volt. Also 906 motors.
 1—10 ton, 915.
 Bar steel frames 10 ton, 6 ton, and 4 ton.
G.E.: All 250 volt. 4 ton 1022, 44" as is
 6 ton 803, 44", as is 5 ton 825, 44"
 6 ton 823, 44" 8 ton 839 motors
 6 ton 801
 8 ton 839
Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt
 1—Jeffrey MH 100, frame only.

MINING MACHINES

Jeffrey, 35B and 4—28A, 250 V. 4—29B 29C
 with shearing head.
Goodman, 12A, 12AB, 12AA, 12G3A, 24B
 1—12G3 250 volt and 2—112 DA, 500 volt.
 2—Permissible Type 12CA. 6—112AA,
 3—124AA.
Sullivan, CE7, CE9, CE10, CR10 Low Vein.
 CR5 for middle cutting.
SUBSTATIONS—275 volts, D. C.
 2—200 KW G.E. Rotaries (600 volt)
 1—200 KW Ridgway M.G. Set.
 2—150 KW West. Rotary.
 1—200 KW 1—100 K Ridgway M-G Sets.
 1—100 KW West. M-G Sets.
 2—100 KW G.E. Rotary.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73,
 29B, 35B and 28A. **Goodman**
 34B, 30B, 30C, 12A, 12AB, 12AA
 33-1-4-T, 31-1-4-T. **General Electric**
 801, 803, 819, 821, 825, 839.
Westinghouse 904, 906, 102, 907,
 YR2, 115. Also 200 KW **Westing-**
house Rotary Converter Armature,
 250 V. Bracket Type, 150 KW
 G.E. HCC Bracket Type, and 150
 KW G. E. TC Pedestal Type.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE * COMPRESSORS * DUMPS * SPEED REDUCERS
FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVELS * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Goose-
neck), 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS * COAL CRUSHERS (double
roll) 12"x16", single roll 24"x36", 36"x36" CONVEYOR HOISTS, 24"x24" and 18"x16" * TURBO-GENERATOR 500 K.W. 275 volt DC * ROPE & BUTTON CONVEYOR
400' long LATHES, SHAPERS * SWITCHES * AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps * MANUAL CIRCUIT BREAKERS 600 amps to
3000 amps * HOISTS, overhead, AC, 3-60-440, 1 ton and 2 ton * CAR RETARDERS, Fairmont * 1 Clam shell bucket 1 1/2 cubic yard, 1—Figure 8 drum * MINE CARS
2 SULLIVAN BIT SHARPENERS * R.R. SWITCHES 85# to 100# HOISTS 5 HP AC and DC GENERATORS DC 250-275 volt, 30 KW to 100 KW. Also 50 KW 125
 volt direct connected to steam engine. **Goodman Scraper Loader.**

GUYAN MACHINERY COMPANY, Logan, W. Va.

SELL YOUR SURPLUS EQUIPMENT



**IT IS NEEDED TO
SPEED THE WAR'S END**



We have a demand for your surplus and idle equipment—a single item or a complete plant. Send us your list of such equipment—and put it to work where it is needed most.

WE PURCHASE ON A CASH BASIS

DULIEN STEEL PRODUCTS, INC.

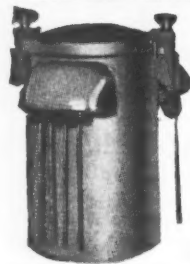
of Washington of California of New York
 200 NATIONAL BLDG. 11611 SO. ALAMEDA 2280 WOOLWORTH BLDG.
 SEATTLE 4, WASH. LOS ANGELES 2, CALIF. NEW YORK 7, N. Y.

COAL MINE EQUIPMENT

ELECTRIC HOISTS
 1—80 HP Ottumwa, Single Drum
 1—150 HP Ottumwa, Single Drum
 2—200 HP Ottumwa, Single Drum
 (or can be furnished as divided drum)
ELECTRIC LOCOMOTIVES
 4—6 1/2-Ton General Electric 250 Volt.
 1—6-Ton Jeffrey, 250 Volt.
 1—7-Ton Mancha, Battery Type.
 1—6-Ton Westinghouse-Baldwin, Battery Type.
 1—5-Ton Mancha, Battery Type.
LARGE MOTORS
 2—500 HP G. E. 2200 Volt, 1800 RPM.
 1—250 HP Fairbanks, Slip Ring, 440 Volt, 1200 RPM.
 2—200 HP G. E., 440 Volt, 450 RPM.
 1—200 HP G. E., 440 Volt, 345 RPM.
MINE PUMPS
 2—6" Manistee—8-Stage, Motor Driven, capacity 900 GPM, 1150' head.
 1—5" Cameron—6-Stage Motor Driven.
BOILER STACK
 1—9' Diameter x 175' Self-Supporting Steel Stack.
 Above are only a few items of our stock.
 —Write for Complete Stock List No. 441—
Morse Bros. Machinery Company
 P.O. Box 1708 Denver 1, Colorado

Bucyrus-Erie 1 1/4 yd. gas-air shovel, rebuilt.
Davenport, Porter, Vulcan 17 to 20 ton steam
 36" gauge S/T locomotives, (4), rebuilt.
Plymouth and Milwaukee gas locomotives, (4), 8,
 25, 45 ton, 36" and std. ga., A-1.
Marion 4 yd. electric #4160 shovel, a.c.
Page Diesel 2 yd. Walker dragline, 65' boom.
Hydroelectric plant, 1000 HP, 60' head, A.C.
Euclid 6 yd. bottom dump crawler wagons (8).
H. Y. SMITH CO.
 828 N. Broadway Milwaukee 2, Wis.

—TRANSFORMERS—



BOUGHT and SOLD

We have several thousand transformers in stock for prompt shipment, and invite your inquiries.

PIONEER TRANSFORMER REBUILDERS

We rewind, repair and redesign all makes and sizes.

One Year Guarantee

THE ELECTRIC SERVICE CO., INC.

"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
 STATION M Since 1912 CINCINNATI 27, OHIO

WANTED

**3/4 to 4 yard
SHOVELS
2 to 8 yard
DRAGLINES**

FRANK SWABB EQUIPMENT COMPANY

Hazleton, Pa. Telephone 3906

WILL PAY CASH FOR

2 Short Wall Cutting Machines
 440 Volt A.C. CW.

WIRE

T. O. TOON COAST FUEL CORP.
 NORTH BEND OREGON

WANTED!
15—20 to 30 cu. yd. Dump Cars, drop-door type
IRON & STEEL PRODUCTS, INC.
 39 years' experience
 13484 S. Brainard Ave., Chicago 33, Illinois
"ANYTHING containing IRON or STEEL"

WANTED
Two Coal Loading Booms
 with operating motors wanted by Illinois mining company for immediate purchase.
 Reply Box No. W-264, Coal Age
 520 North Michigan Ave., Chicago 11, Ill.

SEARCHLIGHT SECTION

REBUILT EQUIPMENT—READY TO SHIP

AUTOMATIC RECLOSING CIRCUIT BREAKERS

- 1—300 Amp. 275 volt, type RBL, serial No. 6193.
- 1—400 Amp. 275 volt, type CRL, serial No. 6327.
- 1—400 Amp. 275 volt, type ARL, serial No. 7530.
- 1—600 Amp. Class I, type AHD, 275 v. Ser. No. 8051.

MINING MACHINES—250 v. DC

- 7—CE-7 Sullivan 36" ga. 1—Sullivan 5B Ruddy.
- 2—Armatures for CE-7 Sullivan 250 v. D.C.

MINE LOCOMOTIVES

- 1—3 1/2 ton Ironton Battery 36" ga.
- 5—5 ton Goodman 30 B, 250 v. 36" ga.
- 2—7 ton Goodman 32-0-4-T 250 v. 36" ga.
- 1—10 ton Milwaukee Gasoline.
- 1—10 ton West. 500 v. 40" ga.
- 4—5 ton Goodman 2600R Gathering Locomotives, 250 v. DC 42 or 44" ga. with cable reels.

DIESEL ENGINE GENERATOR SET

- 1—75 KW, 250 v. DC, type SK Westg Gen. belted to 100 HP Buckeye Horiz. Diesel.

CENTRIFUGAL PUMPS

- 2—1000 GPM Cameron bronze, 100' hd.
- 1—800 GPM Weinman 90' hd. 6 x 5.
- 1—100 GPM Dayton 46' hd. 1700 rpm.

MOTOR GENERATOR SET

- 150 KW Ridgeway 250 v. DC, 900 rpm., 2200/3/60, syn.
- 1—300 KW West. 550 v. DC 1200 rpm. 2200 v. 3/60 complete with AC and DC swb; also automatic reclosing circuit breaker.

TRANSFORMERS—1 ph. 60 cy.

No	Kva	Pri	Sec	Make
1	100	2200	110/220	G.E.
3	100	6600	550/440/220	Pgh.
3	50	11430/6600	550	Al. Ch.
3	50	6600	575	G.E.
3	50	Westg.	4000/2200	230/460
1	37 1/2	2300	220/440	Wagner
3	37	4400	185	West. (Rotary)
35	10	2200	110/220	G.E.
100	7 1/2	2200	110/220	G.E.
75	5	2200	110/220	West.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
300	G.E.	440	900	I
280	Burke	440	600	EMV-65
200	Westg.	220/440	580	CW
150	G.E.	220	375	I-S
100	G.E.	1	220	450
100	Westg.	2200	900	CW
100	G.E.	2200	450	I-M
100	Westg.	220	720	CW-854
75	G.E.	440	1800	ITC-M
75	Westg.	220/440	690	CW
75	G.E.	220	900	
62	Westg.	220/440	1135	
50	Chandey's'n	220/440	1800	
50	G.E.	220/440	1200	HI
50	Allis Chal.	220	490	
50	Westg.	440	1150	CW636A

HP	Make	Type	Volts	RPM
50	G.E.	OM-7	220/440	1160/560
40 to 50	Westg.	440	1150	CW
20	Westg.	220	1735	CW
20	G.E.	220	1200	MT

230 V. DC MOTORS

HP	akeM	RPM	Type
1/2	Cr. Wh.	1600	SM
1/2	G.E.	3450	
1/2	Cr. Wh.	850	EL
1	Louis Allis	1150	INA
1 1/2	Westg.	2200	SK
1 1/2	Westg.	1000	CD
2	Thompson	1100	
2	Robbins-Myer	1750	
3	Robbins-Myer	1750	S
3	Westg.	850	SK
4	Westg.	1180	
5	Westg.	850	
5	Westg.	1600	RC
5	Lincoln	1300	
7 1/2	Cr. Wh.	875	
10	Robbins-Myer	1750	S
10	Allis Chal.	1200	
15	G.E.	850	RC
20	G.E.	925	CQ-15
30	G.E.	1150	RC-31B
30	Westg.	1025	S-7
35	G.E.	900	DLC
35	Westg.	675	SK-140
40	Westg.	950	SK-130
40	Lincoln	720	
300	Otis	560	

(With spare armature)

COAL CONVEYOR

Link Belt Vertical Coal Conveyor, bucket type, approx. 30 ft. good for 100 RPM, hoists 25 TPH, all new buckets and gears complete with 20 HP AC motor.

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

ROTARY CONVERTERS

- 500 KW G.E. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V., Transformers.
- 500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V., Transformers.
- 500 KW WEST. SYN 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V., Transformers.
- 300 KW G.E. SYN 275 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
- 200 KW G.E. SYN. 275 V., HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
- 150 KW G.E. SYN. 275 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
- 150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

- 200 KW G.E. IND., 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Manual Switchgear.
- 200 KW R.W. SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. 60% P.F. Manual Switchgear.

LOCOMOTIVES

- 13-T WESTGHE, 250 V., 908-C Mts., 36" Ga.
- 13-T GOODMAN, 250 V., 36-A Mts., 36"-42" Ga.
- 10-T WESTGHE, 250 V., 907-C Mts., 36"-44" Ga.
- 10-T WESTGHE, 500 V., 907-C Mts., 36"-44" Ga.
- 8-T WESTGHE, 250 V., 906-C Mts., 36"-44" Ga.
- 8-T WESTGHE, 500 V., 906-C Mts., 36"-44" Ga.
- 8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.
- 6-T WESTGHE, 250 V., 904-C Mts., 36"-48" Ga.
- 6-T Gen. Elec. 250 V., 823-A Mts. 36"-44" Ga.

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Incorporated

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- 22"x10' LeBlond 3 S.C.D. Q.C.
- 26"x16' Pittsburgh, 3 S.C.D. Q.C.

SHAPER

- 20" Columbia Heavy Duty, Cone.

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218 E. Second St., Cincinnati, Ohio

MINE EQUIPMENT

- Transformers, 6600, 2200 & 440 Volt, 1 & 3 Phase
- Hoist, 50 Hp Lidgerwood Double Drum, Tall Rope
- Controllers, Both Locomotive and Auto Mine Hoist
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- 250 HP 3/60/2200 V Weco 277 RPM S.R. Motor
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- Switchboards Built to Order

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Which of these cars could you use?

- 85, Hopper, Double, 50-Ton
- 10, Hopper, Side-Discharge, 50-Ton
- 150, Refrigerator, 40-Ft., 40-Ton
- 16, Refrigerator, 36-Ft. 30-Ton
- 17, Ballast, Composite, 50-Ton
- 25, Box, 36-Ft., 40-Ton; Steel Ends
- 4, Dump, Koppel, Drop-Door; 20-Yd., 40-Ton
- 20, Dump, K & J Automatic, 16-Yd., 40-Ton
- 20, Flat, 40-Ft., 50-Ton
- 43, Gondola, Composite, 36-Ft. & 40-Ft., 40-Ton
- 10, Gondola, Steel, 50-Ton, High-Side
- 30, Tank, 8000-Gallon, 40 & 50 Ton

All cars are priced to sell!

IRON & STEEL PRODUCTS, INC.

39 Years' Experience

13484 S. Brainard Ave., Chicago 33, Illinois

"ANYTHING containing IRON or STEEL"

★ MINING EQUIPMENT READY FOR DELIVERY ★

CUTTING MACHINES

- 1—212-AA Goodman Low vein, 250 volt
- 1—312-AA Goodman Low vein, 250 volt
- 2—35-L Jeffrey Low vein, 250 volt
- 3—12-AA Goodman Standard, 250 volt
- 2—12-AA Goodman Standard, 500 volt
- 1—112-AA Goodman Universal, 250 volt
- 1—28-A Jeffrey, 250 volt
- 1—28-A Jeffrey, 500 volt
- 1—29-C Jeffrey, 250 volt
- 1—29-B Jeffrey, 250 volt

LOCOMOTIVES

All 250 volt

- 10-Ton Jeffrey, MH-110, 44" gage, inside frame
- 10-Ton Jeffrey, MH-78, 42 or 44" gage, outside frame
- 13-Ton Westinghouse 79, 48" gage
- 8-Ton Westinghouse 63, 44" gage
- 6-Ton 30-B Goodman, 42 to 48" gage

LET US KNOW YOUR NEEDS—WE BUY, SELL, AND TRADE

ALL-STATE EQUIPMENT CO. INC.

LOGAN, W. VA., PHONE 884

- 4-Ton Jeffrey, MH-96, 48" gage
- 4 1/2-Ton Ironton, low vein with G.E. cable reel

MISCELLANEOUS

- 1—Link Belt Loading boom 42" wide, 44' long
- 1—Pan conveyor 26" wide, 44' long
- 1—Fig. 8 Incline rope drum, for 1" rope
- 3—Goodman Duckbills
- 1—100-KW. West. SK Compd. wound Generator, 250 volt
- 1—Westinghouse YR-4 cable reel
- 1—100-HP. Natural gas engine with 220 volt A.C. Generator and complete switchboard equipment
- Transformers, Hoists, Tackle equipment, A.C. and D.C. motors, and miscellaneous coal mining and industrial equipment.



PROMPT SHIPMENT FROM OUR WAREHOUSE

MINING MACHINES

5-12 DA 50 HP 250 v. Goodman Shortwall
36 B Jeffrey 250 v. Low Vein #14318
C 7 Sullivan 250 v. DC
35 B Jeffrey 250 v. 6' cutter,
2-29 C Jeffrey 250 v. Top Cutters
112 Da Goodman 250 v. 50 HP Universal
3-Low Vein Sullivan CR-2 (250 v.)

STORAGE BATTERY LOCOMOTIVES

2-6 Ton G.E. Permissible Locomotives 36/44"
Ga. O.S. armorplate frame, inside steel tired
wheels, 2-HM 825 Ball Bearing Motors, Type
LSBE Class 2C6 From C9, 13 1/2' long, 50"
high, 60" wide and 44" wheel base.
Each of the above units equipped with Edison
Battery 80 cell A-19—one new in 1940, the
other in 1939.

2-5 to 5 1/2 Ton Type D Iron-ton, 36 or 42" Ga.
Low Type.

1-4 Ton Jeffrey 42 or 44" Ga. with 2 MH 108 Ball
Bearing Motors, Battery Box on top of locomotive.
1-5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing
Motors. Battery box on top of locomotive.

1-5 1/2 Ton Jeffrey 36" Ga. with 49 cell 23 plate New
Exide Ironclad Battery.

4 Ton 36" Ga. Atlas.

4 Ton 36" Ga. (2 motors)

4 Ton 36" G.E. (2 motors)

(Haulage)

10 Ton Jeffrey with 13 Ton Equipment O. S. armor-
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Ball Bearing Motors, 36/42" Ga. completely rebuilt.
13 Ton Westgh. 250 V. 36" or 40" Ga.
1-5 Ton West. 250 V. 36 or 42" Ga. with Electric
Gathering Reels, Bar steel frame.

6 Ton Baldwin West. 250 v. 36/42" Ga. #48747 904
Motors outside bar steel frame, inside steel tired
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2-4' x 5' single deck Tyler Hummer Screens Type
37 equipped with V-16 Vibrators No. 2860 and
2867 designed for 110 v. AC 15 cy.

MG SETS 3 ph. 60 cy. (Syn.)

150 KW G.E. 250 v. -2200/3/60 900 RPM.
150 KW Ridgway 250 V. DC 2200 V. AC 900 RPM.
100 KW Ridgway 250 V. DC-2200 V. AC 1200 RPM.
75 KW 250 v. G.E. Type DLC G.E. opd. wd. Inter-
pole Gen. dir. con. to G.E. 100 HP Induction
Motor 220 or 440 v. 3 ph. 60 cy. 1160 RPM with
Starter and DC Panel.

MOORHEAD-REITMEYER CO., INC.

PITTSBURGH, PENNSYLVANIA

AIR COMPRESSORS

492 cu. ft. 100# C hg. Pneumatic straight line heavy
duty Diesel oil driven Compressor unit.

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100 KW 250 V. DC Westgh.—Skinner Engine.
50 KW West. 125 V. DC—Skinner Engine.

SLIP RING & SQ. CG. MOTORS (3 ph. 60 cy.)

HP	Make	Speed	Wdg.	Type
500	G.E.	450	S.R.	MT 412
200	G.E.	250	S.R.	MT 412
200	G.E.	600	S.R.	I-M
125	Al. Ch.	435	S.R.	
100	G.E.	500	S.R.	
100	Al. Ch.	575	S.R.	MI-25 cy.
100	West.	900	S.R.	CW.
100	G.E.	1200	S.C.	

PUMPS

250 GPM 250# or 575' Head 2 cyl. Hor. National
Transit 6" suc. 4" dia. enclosed driven by 40 HP
Motor.

HOISTS

500 HP Connellsville Sgl. drum slope Hoist complete
with AC Motor and contactor control.

75 HP Lidgerwood sgl. fr. drum

50 HP Diamond 2 drums same Shaft

30 HP Clyde sgl. drum AC Motor

30 HP Double drum—Tandem

15 HP Lidgerwood sgl. dr. AC Motor

400 TRANSFORMERS (Westgh. & GE 1 ph.)

Qu.	KVA	Pri. V.	Sec. V.
40	5	2080/2200	115/230
31	7 1/2	"	"
28	10	"	"
2	25	2200	244/488
3	50	2000	2000

AC AIR BREAKERS (unused)

8-200/400 amp. 3 pole ITE 220 v.

2-300/600 amp. 3 pole ITE 220 v.

COAL CRUSHERS

18" x 24" Double roll New.

18" x 30" Double roll New.

SYNCHRONOUS MOTORS

HP	Make	Voltage	Speed	Type
220	G.E.	2200	600	ATI
200	West.	2200	900	
150	G.E.	2200	900	ATI

Each of the above has a dir. con. exciter.

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Model 900 P & H Dragline, Fairbanks-Morse Diesel
engine, 100' boom, 3 yard bucket. Rebuilt.

Model 800 P & H Combination Shovel and Drag-
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man oil engine. Rebuilt.

Loomis "Clipper" Full Crawler gas powered Blast
Hole Drill. Rebuilt.

Model 85 Northwest Dragline, 70' boom, 2 1/2 yard
bucket, Twin City oil burning engine. Rebuilt.

FRANK SWABB EQUIPMENT CO.

HAZLETON, PA.

Telephone 3906

MOTOR-GENERATOR SET

IMMEDIATE DELIVERY

600 h.p. motor with one 325 k.w. genera-
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direct, with three 187 1/2 h.p. motors at
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3—TRACK, ALL STEEL

SHAFT TIPPLE

complete including shaker
screens, two loading booms.

Available for

immediate dismantlement.

WEST KENTUCKY COAL CO.

Earlington, Ky.

ELECTRIC LOCOMOTIVES

1-10 ton G. E. steel frame, 250 V. H.M.
830-A motors.
1-8 ton Goodman steel frame, 250 V. Type
3104-T. 42" gauge.
1-6 ton Jeffrey, with MH-88 250 V. motors
and reel.
1-6 ton West. bar steel frame with 904-C
250 V. motors.
1-5 ton G. E. ready to operate, 42" ga.

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2-124 EJ Goodman, 50 HP, 250 V. permis-
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1-29C Jeffrey 250 V. arcwall.
1-12DA Goodman, 50 HP, 210 V. D.C.
shortwall.
1-12 G3 Goodman shortwall, 3/60/220 V.
1-12AB Goodman shortwall, 250 V. D.C.
1-36B Jeffrey 250 V. longwall.
1-90 L Goodman Elevating Conveyor.

MOTORS AND GENERATORS

1-100 KW West. compound wound D.C.
generator, 250 V.
1-100 KW Rotary Converter, 275 V. D.C.
with 2300-4000 V. transformers.
1-600 HP Allis-Chalmers Syn. 3/60/2200
V.
1-165 HP G. E. Syn. 2200 V. 900 RPM.
1-100 HP Crocker-Wheeler Syn. 220 V.
1-15 HP G. E. bull bearing, 3/60/220-440
V.
1-15 HP Allis-Chalmers, same as above.
1-7 1/2 HP West. same as above.
1-5 HP G. E. same as above.
1-2 HP Century, single phase.

We have a complete line of D.C. motors.

Send us a list of any equipment you may
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TIPPINS MACHINERY COMPANY

Pittsburgh, 13, Pa.

FOR SALE: 1 1/4, 1 1/2, 1 and 7/8" Plow
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WIRE Centers, 6 x 7 and 19 construction; almost
NEW; long and short lengths; for Drag lines, In-
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1-Ottumwa Band Friction 36" will coil
3500 ft. 7/8" rope, 125 HP Motor.
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2500 ft. 7/8" rope, 100 HP Motor.
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150 HP Motor
1-Flory-Keyed Drum 52" will coil 2000
ft. 1" rope, 150 HP Motor.
1-Vulcan Sliding Pinion 60" will coil
3500 ft. 1" rope, 200 HP Motor.
1-Vulcan-Cylindro Conical Shaft Hoist
350 ft. 1 1/8" rope, 400 HP Motor.
1-Connellsville-Cylindro Conical Shaft
Hoist 250 ft. 1 1/2" rope, 800 HP Motor.

And other hoists to
suit all mining conditions

Jones Mining Equipment Co.

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MORROW APRON CONVEYOR 165'X60" as in-
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Reciprocator.
SIMPLICITY 3'X6" LS SINGLE DECK SCREEN
complete right hand drive. Serial 136-LS-YM-
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ONE PORTABLE JR OIL SPRAY, wired 3 heat
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GUNDLACH MINE—E. ST. LOUIS, ILL.

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- 160 Kopple Side Dump Cars, Length inside 9', Width inside 6'-9", Depth 26", capacity 5 ton, 36" Gauge, 20" wheels, J. B. Bearings, Alliance Draw Bars, Double springs.

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- 2—CE-7 Sullivan Mining Machines, 35 H.P. A.C., 36" Ga. Tip Turn Tables, Cincinnati Chain, #8000 Series, with Reels, Cables and Drag Chains.

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- 7000—36" Steel Ties, excellent condition, for 30# and 40# Rail—most are new.

BEE BEE MINE—BELLEVILLE, ILL.
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STEAM LOCOMOTIVES

- 2—Davenport Saddle Tank Locomotives, 36" Ga. One 15 Ton and one 18 Ton.
- 3—Porter Saddle Tank Locomotives, 36" Ga. 15 Ton.

GASOLENE LOCOMOTIVES

- 2—Plymouth Gasolene Locomotives, 36" Ga., 7 Ton.

LOADERS

- 3—Jeffrey Loading Machines and 1-Wilson Loader all in need of some repair.

MISCELLANEOUS

- 2—Steel picking tables, one 4' x 36' and one 4' x 30' Shaker Screen with 15 H.P. motor, 200 tons Rail 40# to 60#, Electric Motors, 50,000 Ft. 1-0 Duplex power cable, Misc. parts and Mine Supplies.

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FIRMAN EQUIPMENT CORPORATION
TERRE HAUTE, IND.

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- 1—7-Ton Gas Locomotive, 36" Ga., Milwaukee Locomotive Works
- 1—9-Ton Gas, 36" Ga., Whitcomb
- 1—8-Ton 0-4-0 Vulcan, S/G Ex. Cond.
- 2—25-Ton 0-4-0 Porter Saddle Tank Locos. Oil Burners: A.S.M.E. Code, Excel. Cond.
- 1—50-Ton 0-6-0 Vulcan Locomotive
- 1—65-Ton 2-6-0 Mogul Loco. Oil-burning.
- 3—70-Ton 0-6-0 Baldwin Switching Locos. ICC condition
- 1—70-Ton Gas-Electric Locomotive
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- 1—80-Ton 0-6-0 Lima Switching Loco. Excellent condition

Other Locomotives, Too

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Cedar Rapids II Super Tandem Crushing Plant.
 Lorain 75-B Comb. Shovel & Dragline, 1 1/2 Yd.
 Lorain 75-B Shovel, 1 1/2 yard.
 Caterpillar 50 Diesel Tractor with Bulldozer.
 Allis Chalmers HD-14 Tractors.
 Byers 1 1/2 yard Crane, 45' boom.

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NEW "SEARCHLIGHT" ADVERTISEMENTS

received by July 25th, will appear in the August issue, subject to limitations of space available.

Address copy to the
 Departmental Staff

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Attention Dealers and Consumers BARGAIN IN MINING MACHINES

We have suspended business operations and have
 for sale the following—

5 CH8 Sullivan longwall, AC. 3 ph., 60
 cy., 220 volt

2 CE7 Sullivan shortwall AC. 3 ph., 60
 cy., 220 volt

1 CE7 Sullivan shortwall DC,
 (completely overhauled and rebuilt,
 using new parts wherever necessary)

1—Rebuilt motor assembly for CE7 AC
 Sullivan shortwall

1—Complete motor assembly with con-
 troller for 250 volt, DC, Goodman

Also several thousand dollars worth of
 selected secondhand parts mostly for
 shortwall machines.

We prefer selling entire lot to one party
 and would give real bargain. If inter-
 ested, write or wire—

J. ROSENBAUM & SON, INC.

Centerville, Iowa

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 Clarksville, Arkansas

NEW and REBUILT STORAGE BATTERY

LOCOMOTIVES

1 1/2 to 10 Ton—13" to 56" Track Gauge
GREENSBURG MACHINE CO.
 Greensburg, Penna.

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Link-Belt has had a long and varied experience in the engineering, manufacture and application of coal storage and reclaiming equipment of all kinds to many different conditions. Illustrations on this page show but a few of the many coal storage installations which we have made. Let our engineers operate with you in selecting a modern method of storing coal at lowest cost.

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- COAL HANDLING
- PREPARATION -

EQUIPMENT